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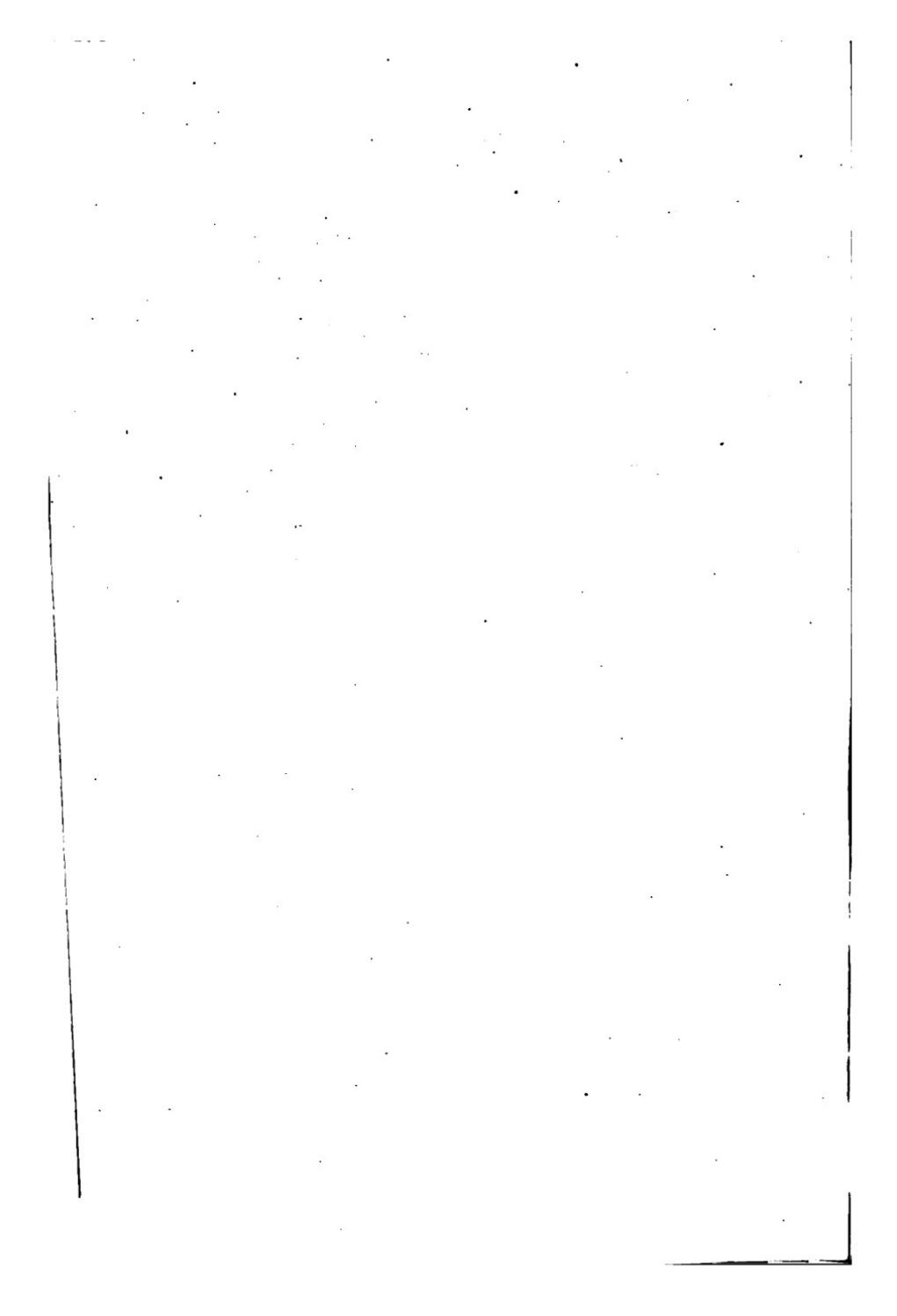
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CLINICAL LECTURES
ON
DISEASES
OF THE
URINARY ORGANS.



CLINICAL LECTURES ON DISEASES OF THE URINARY ORGANS

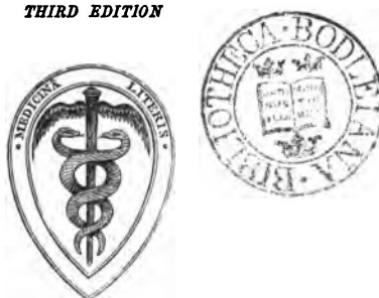
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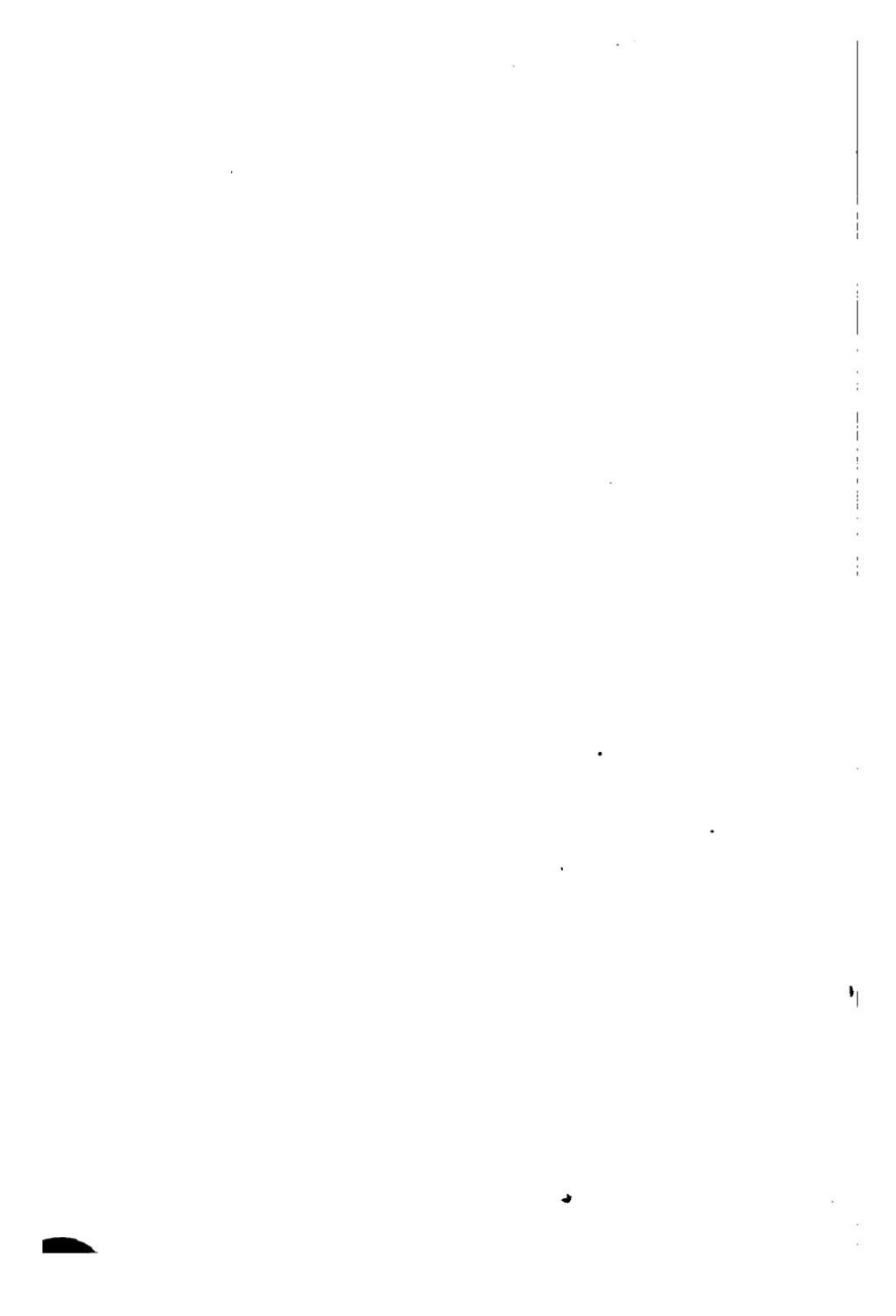
SURGEON-EXTRAORDINARY TO H.M. THE KING OF THE BELGIANS; PROFESSOR
CLINICAL SURGERY, AND SURGEON TO UNIVERSITY COLLEGE HOSPITAL.

THIRD EDITION



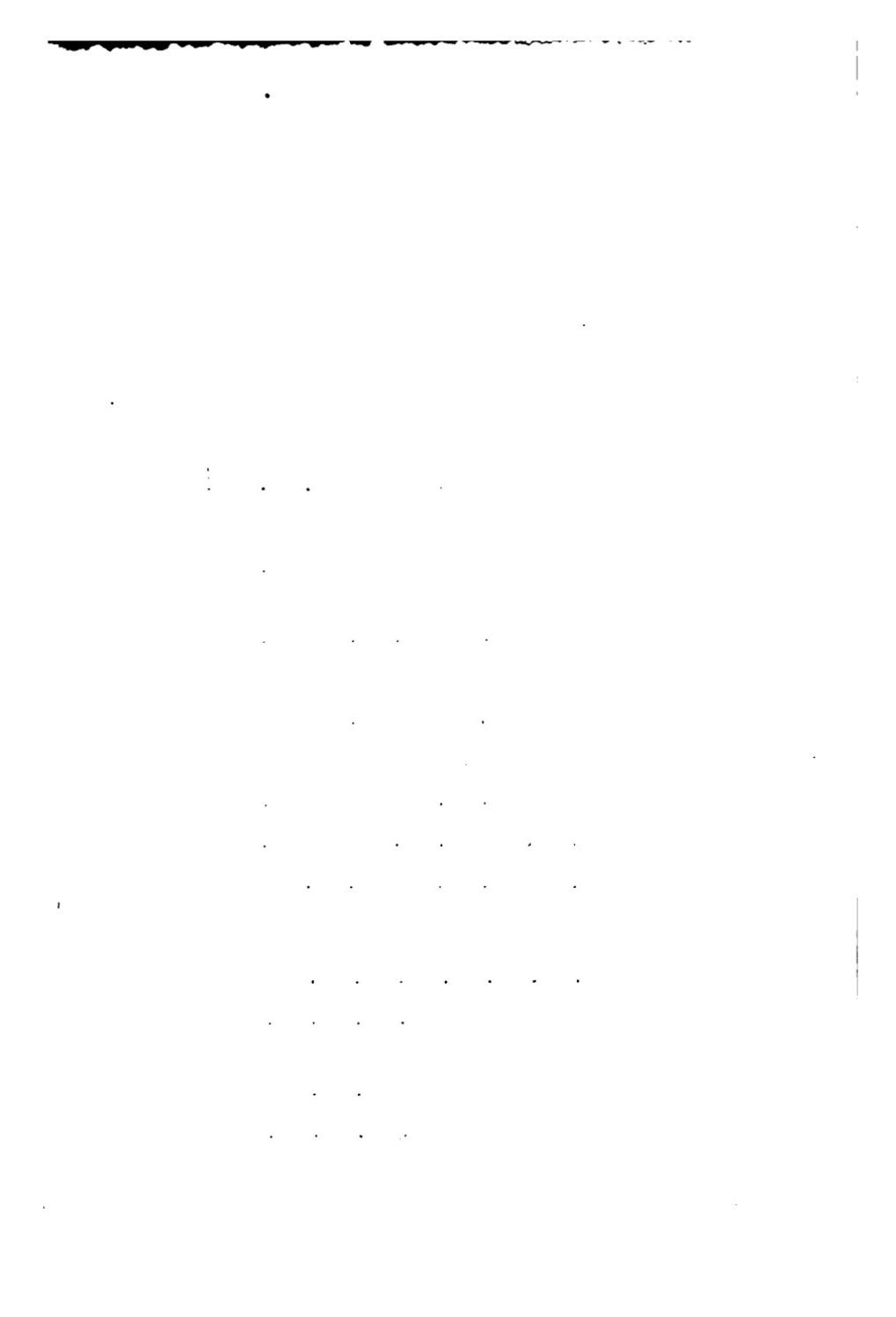
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P R E F A C E.

I THINK it right to say that these Lectures were never committed to writing by me. They were delivered in a colloquial style, after the arrangement of the subject had been well considered, and were reported verbatim by one of our best shorthand writers. The copy furnished by him was corrected, some of those tautologies which seem to be necessary in teaching removed, and then sent to the *Lancet*. But each Lecture still required more space than was available in the columns of a weekly journal, and I further reduced it, perhaps one-fourth. I now present, in one small volume, at the suggestion of, I may truly say, numerous correspondents, known and unknown to me, the corrected copy in full, unchanged in form, and therefore unshorn of the familiarities which the conversational style peculiar—and, I believe, appropriate—to the class-room demands. And I do this, also, because I prefer that these Lectures, originally short, should not suffer any abbreviation, and because I desire to offer, not merely to the members of my own clinical class, but to students at large, some of the fruit of a long and careful study in that field of practical medicine, in its widest sense, to which they relate.

35, Wimpole Street, London,
Nov., 1868.

PREFACE TO THE THIRD EDITION.

I HAVE continued to give this course of Lectures every year, making such modifications and additions as our increasing experience has demanded. The present edition contains the course delivered by me at University College Hospital in the session of 1872-3, and comprises therefore all the most recent alterations, as well as two Lectures not in the previous editions, making fourteen in all, instead of twelve as before. My aim has been to produce in the smallest possible compass an epitome of practical knowledge concerning the nature and treatment of the diseases which form the subject of the work; and I venture to believe that my intention has been more fully realized in this volume than in either of its predecessors.

35, *Wimpole Street, London,*
January, 1873.

DISEASES OF THE URINARY ORGANS.

LECTURE I.

50

INTRODUCTORY: DIAGNOSIS.

GENTLEMEN,—I propose to give a course of lectures on the Surgical Diseases of the Urinary Organs, and my object will be to afford you that information which will be most useful at the bedside. I shall not consider their anatomy or physiology, since that would make the course much too long. In the systematic lectures of the College it is impossible to communicate all those practical manœuvres, those little things which one arrives at by experience, either in the way of diagnosis or treatment, which are so valuable in practice hereafter; neither is it possible that you should all acquire them at the bedside, since no hospital can furnish patients sufficient for the purpose; but you can learn a great deal by the conversational communications which are made here. It will be my aim to render available the result of experience which it has cost me years to acquire, and I shall do my best to furnish to you what of it is thus communicable in as many hours.

I have selected this course of clinical lectures on the

urinary organs for two reasons. First, because my wards always afford *groups* of these cases; you can always find there abundant material for consideration at the weekly clinical lecture. Secondly, because I do not know any set of diseases that are so successfully dealt with if you understand what you are about, or any in which you may make such dangerous mistakes if you are not well acquainted with them. Neither do I know any diseases in which you can afford so much relief to suffering, none in which a skilled hand can do so much for the patient, and none in which you can gain more credit for yourselves. It is therefore exceedingly important that you should be thoroughly acquainted with them.

I hope, in the course of fourteen lectures, to carry you through the greater portion of the list of subjects named in Part I.

I. DISEASES OF THE URINARY PASSAGES.

a. *Diseases essentially inflammatory.*

Urethritis,
Prostatitis, } acute and chronic.
Cystitis,

b. *Diseases essentially obstructive.*

Stricture of the urethra.
Hypertrophy of the prostate.

c. *Calculus Diseases.*

Of the urethra.
Of the prostate.
Of the bladder.
Of the pelvis of the kidney.

d. *Tumours—malignant and non-malignant.*

Of the prostate.
Of the bladder.

II. DISEASES AFFECTING THE SECRETING ORGANS.

All organic changes in the kidney; also those altered conditions of the urine which depend on constitutional disease, such as Bright's disease and saccharine diabetes.

But, before doing so, I shall ask you to consider for a moment the title I have affixed to this course—viz. “The Surgical Diseases of the Urinary Organs.” Now, you may inquire, “What are the surgical diseases of the urinary organs, and what are not?” To my mind it is very easy to tell you what are surgical diseases of those organs, but not so easy to tell you what are not. Look at the list before you, and see where the line should be drawn. Certainly the first division belongs wholly to that class—all diseases of the urinary *passages*, excluding the kidneys, which we will assume to be secreting organs. Undoubtedly all that part belongs to the surgeon. The physician, conventionally, claims the second; but since it is impossible to make a diagnosis of any of those diseases without well understanding the whole, and as the physician does not make a physical examination by means of an instrument, I am compelled to regard all affections of the urinary organs as naturally coming within the province of surgery. This statement may not be universally received; but if we consider the matter, we shall see that it is absolutely necessary for the diagnosis of urinary diseases to be able to pass a sound or catheter. I do not say that the physician is incapable of doing this; but, conventionally, it is not practised by him. And you can no more treat diseases of the urinary organs without the ability to use these instru-

ments than you can treat diseases of the chest without understanding the use of the stethoscope.

The first step in our course is naturally that relating to Diagnosis. I say almost nothing about the pathology and treatment of any one of these diseases to-day. The question before us now is diagnosis, and you will understand this to be a most important thing in all diseases—to know accurately what you are about to treat: there is then little difficulty as to the management. Many books can tell you the one; no book can tell you the other. Diagnosis can only be accomplished by the application of certain rules after some practice. It is the first thing to learn and to use; it is the last thing to be perfectly acquired. Indeed no man, let him live as long as he may, will ever be a perfect diagnostician. He may approach perfection; but if he is a diligent student, as he ought always to be, he will improve his powers of diagnosis as long as he lives. That is the reason why age or experience gives value to an opinion. It is long observation and extended experience that enable a man to arrive at diagnosis with greater certainty than the younger practitioner can possibly do.

Then we want to learn not merely diagnosis, but the *art of making a rapid diagnosis*. When called to the bedside, your action must often depend on the first three or four minutes of your interview. It may be easy to go home quietly, think over the case, pull down the authorities, and say, "I think the patient has so-and-so." That will not always do: it may do in some cases, and it had better do than that you should attempt to treat the case without having made up your mind as to the diagnosis. But that which will make you successful, that which distinguishes between the intelligent practitioner and him who is not so,

is the ability to make a rapid as well as an accurate diagnosis of the case before him. Now, in calling your attention to this subject, I am afraid I cannot guarantee that you shall leave this theatre an hour hence first-rate diagnosticians of these diseases; but I can give you the method which, after a good deal of thought and experience, I have found best to answer the end proposed, and you can apply it afterwards for yourselves.

First, you should pursue your diagnosis on a uniform plan—that is, you should adopt a uniform mode of interrogating each case of urinary disease. And what I say of this disease is applicable to most others. Your object is to collect *facts*, and your diagnosis consists of the *inference* which you draw from those facts. You will endeavour to arrive at the facts by the shortest possible route, and by the most accurate method. You should ask questions, make observations by the eye, by the hand, and by instruments, and then examine the secretions. Take them in that order: first, observation by questions; second, observation by the eye, by the hand, and by the instrument, which after all is but a long finger. You have no finger which is long enough to go down these narrow passages, and you lengthen it by means of your instrument. So with regard to the eye: your endoscope, whatever it may be worth (as to which I shall have something to say presently), is simply an increased ability to see.

First of all with regard to questions. You may make out most cases of urinary disease—say five out of six—by four simple questions, including the minor extensions which arise out of them. I always ask the patient these four questions, and in the following order:—

The first question is, “Have you any, and, if any, what

frequency in passing water?" Then, as a branch of that question, springing out of it, I ask whether the frequency is more by day or by night, or influenced by movements or by any particular circumstance. How the question applies I will tell you afterwards.

Then, secondly, I ask whether there is pain in passing urine, and whether *before*, or *after*, or *during* micturition; and whether at other times also, and if produced or aggravated by quick movements of the body. The locality of the pain is also to be ascertained.

Then I ask, as a third question, "Is the character of the urine altered in appearance; or is there anything unusual in the stream itself? Is the urine turbid or clear?" Possibly the patient will tell you that it is turbid; but you find, on questioning further, that it was passed perfectly clear, and only became thick after cooling or standing. Also, as arising out of this, you may often ask, "Does it vary much in quantity?" noting, of course, the specific gravity. The healthy standard, however, must be allowed very extensible limits; still quantity, I need not tell you, is a very important element in regard of renal disease. The stream may be small, forked, or twisted, or stop suddenly when flowing.

The fourth and last question is—whether blood has been passed in any way, whether it is florid or dark, whether passed at the end or at the beginning of making water, or whether independently of micturition altogether; and such like supplementary inquiries.

These are the four questions; and let me remark, that the answers you get will depend very much upon the way in which you put the questions. The patient is not always self-possessed, or he does not clearly understand the nature of the question you put. It is necessary to be very precise

and very distinct in your questions if you wish to get accurate answers. In fact, there is no such difficult thing in all experience, whether in our profession or out of it, as to arrive at facts: and let me remind you again, that diagnosis consists in the acquisition of *facts*, and that it is impossible without them. Now you will say, how do I apply this to the list of diseases before you?

First, as to the frequency of passing water. There is no serious affection of the urinary organs, except one or two which I will name, in which you have not more or less frequency of passing water. Thus the following is an exception: A man may have stricture to a considerable extent; the stream may be very narrow, and he may not for some years complain of frequency of passing water, although the symptom will appear sooner or later. Now you will observe that I have classified these diseases, that we may deal with them more easily. First of all, there are the inflammatory diseases—inflammation of the urethra, of the prostate, and of the bladder. In all these you have frequency in passing water. Not necessarily, however, in urethritis, until it reaches the distant part of the canal near the bladder. I do not propose to enter upon the subject of urethritis here, as you have frequent opportunities of studying it in the out-patients' room. I am now only referring to this symptom of frequency of passing water as existing more or less in all these three diseases at some time or another. In hypertrophy of the prostate you have it, and it is remarkable that it is more at night than in the day. In chronic prostatitis it is usually present to a small extent; in cystitis it is, of course, a characteristic symptom. In calculous diseases it is prominently met with, and generally its degree is in proportion to the amount of

movement permitted to the patient. Tumours, of course, malignant and non-malignant, are attended by the same symptom. In pyelitis, and in almost all organic changes of the kidney, in Bright's disease, and in diabetes, there is frequency of making water. Whenever the natural characters of the urine are altered before it reaches the bladder, the secretion produces irritation. This fact is worth dwelling upon for a moment. Diluted or watery urine is often regarded as unirritating; on the contrary, it is not generally well retained by the bladder. The bladder is, as a rule, never so content as when it contains a urine of average, or more than average, specific gravity. Some persons who are nervous, and particularly hysterical patients, will pass urine which is quite pale, almost like natural water, and the bladder is always more or less uncomfortable from it. Of course, in diabetes, you have not only the character of the urine altered, but the quantity much increased, with frequent micturition as the necessary consequence. And I may remark that it is chiefly in renal affections that increase in quantity takes place; while, on the other hand, suppression of urine is always a malady of the kidneys.

The next question has reference to pain; and when you get answers as to the nature and seat of pain, you will begin to see your way towards a diagnosis. In prostatitis there is usually pain at the end of passing water—less severe, but resembling somewhat that of stone; as the bladder contracts, when empty, on the tender prostate. In cystitis the pain is usually before micturition, because the inflamed mucous lining of the bladder is sensitive on being distended, and the organ is anxious to get rid of its contents. The usual seat of pain is just above the pubes. When cystitis is acute, pain may be felt in the perineum also; but in

chronic or subacute cystitis it is supra-pubic, and not at the end but at the beginning of making water, unless the prostate is affected, and then the tender prostate gives a little pain at the end, as I have just said.

In stricture of the urethra there is often pain about the seat of the obstruction, an idea of which you may obtain by a simple experiment. If, when passing urine with a full stream, you suddenly narrow the passage with your finger, so as to diminish the stream one half or more, you will experience an acute pain.

There may be pain with hypertrophy of the prostate, inasmuch as this is frequently associated with chronic cystitis, when the pain is before making water, and not afterwards—differing in that respect from stone. The bladder wants to get rid of its contents, and can do so but slowly, on account of the enlarged prostate, which stands as a barrier in the way. During its first contractions, which expel but little urine, there is pain above the pubes and deep in the perineum; but when a third or a half of the contents has issued, the patient is relieved.

I shall not dwell upon calculous disease of the urethra. The calculus is only a temporary lodger there, and as it can often be felt externally by the hand, there is rarely any difficulty about the diagnosis. Calculous disease of the prostate is also rare. I shall not complicate what I wish to be a simple matter by dwelling upon it, but call your attention to the commoner condition of calculus in the bladder. Here the pain is quite distinct in its character: it is felt at the end of passing water, because, the bladder being emptied, the rough surface of the stone is left in contact with the mucous membrane, doubtless that covering the neck of the bladder, which is unquestionably a sensitive spot. As soon

as sufficient urine has trickled down into the bladder, to separate the coats from the stone, relief is obtained. Then the pain is felt at the end of the penis, within an inch of it, about the base of the glans. Furthermore, the pain is increased by movement: in other complaints it is not necessarily so. Put a patient in a rough-going vehicle, or make him jump from a step, or perform any rapid movement, and instantly he feels severe pain, probably at the neck of the bladder, but also at the end of the penis. In prostatitis, inasmuch as the neck of the bladder is involved, there is usually some pain at the end of the penis, which is a reason why chronic inflammation of the prostate is sometimes mistaken for stone.

With regard to calculus of the kidney, I have little to say about it here. Of course you have pain referred to the locality, right or left, not often to both kidneys; there is tenderness also, and much increase of pain on movement. It is usually on one side only, and perhaps more frequently on the left than on the right side, and it is often felt over the hip and towards the groin of the affected side, although the calculus is fixed, and there may be no reason to believe it will pass by the ureter. In affections of the kidney, too, the pain is sometimes felt only or chiefly about the bladder and urethra, a circumstance never to be forgotten.

One cannot, perhaps, say much about any characteristic pain in connection with tumours. They may be situated in any part of the bladder; may obstruct the urine more or less; and accordingly as they produce cystitis, and obstruct the flow of urine, pain will be experienced.

The next question is as to the characters of the urine itself. Now, suppose your patient has told you that he has frequency in passing water, pain at the end of the penis

and at the neck of the bladder, and that the pain and frequency are aggravated by movement. You may begin to say to yourself, "Perhaps the man has stone in the bladder, and I shall have to sound him." Two questions only have already put this probability in your way, and you interrogate as to the character of the urine. See how this carries you a step further. We recommence our list as to this inquiry. A preliminary remark, however, about examining urine. I do not propose to teach you here a systematic mode of doing this; because it is supposed not to be in my department, and you would only be repeating that which it will be your duty to learn elsewhere, and I hope you will do so thoroughly. But there is this hint which I may give with respect to it. Whenever you want a specimen from your patient to examine, do not tell him to send you a bottle of it passed in the usual way, or you will get a mixture of often doubtful value. What you require is the secretion of the kidneys, plus only anything there may be in the bladder; you do not want it complicated with anything which may come from the urethra. Let the man pass two or three tablespoonfuls through the urethra first, so as to sweep out whatever may be there, which may be thrown away, or be put into a separate bottle, after which you will get a pure specimen—at any rate one of which you will know the source. You will have the renal secretion plus anything in the bladder. Suppose the man has gleet or chronic prostatitis: there will then be a quantity of muco-purulent matter in the urethra. If all this be carried into one vessel with the urine, how will you determine the different products, and decide, by the eye or by the microscope, what has come from the urethra, what from the prostate, and what from the kidneys? You can-

not do it; but if you get rid of the source of error by flushing the urethra, so to speak, and emptying the contents into a separate glass—say a wineglass—then taking the bulk or remainder in a tumbler, you will generally have a sample of urine that you can do something with. If I felt disposed to indulge you with gossip, I could tell you stories of the gravest blunders committed by not attending to that simple point. I can at all events tell you that I have more than once known a learned practitioner treat a patient for pyelitis who had nothing but a profuse discharge from the urethra; how the urine had been sent twice a week in a bottle scrupulously made clean for the purpose; and because a quantity of pus was found in it, the patient, who had some symptoms corroborating that view, was treated during some months for pyelitis; how a surgeon at length found out that the whole of the matter came from the urethra, so that when the urethra was flushed into the first glass all the matter was there, and that the remaining urine was clear and healthy; and, finally, that the “pyelitis” soon disappeared under local treatment of the urethra. I do not know whether any one else may tell you of that simple mode of determining this matter; and I will assume that in the future you will none of you make such a mistake as that I have mentioned. I only know too well how necessary it is to call attention to it, and how seldom it is done. *

Referring first to prostatitis, it is always associated more or less with shreds in the urine, which come from the prostatic part of the urethra; and if you separate the urine as I have told you, you will find that the whole of the thick matter will be in the first glass, while that remaining behind will be clear. How would it be with regard to calculus?

* See further remarks on this subject at the close of the last lecture.

You might have muco-pus in the first glass, but you would have more in the second from the bladder. Not very often have you calculus in the bladder without having some muco-pus from the bladder itself. Occasionally, but very rarely, do I find a man with stone in the bladder having perfectly clear urine. Not commonly do I sound a man for stone who has clear urine, unless he has marked symptoms, because the presence of stone in the bladder almost always gives rise to a certain amount of cystitis, and there is deposit in consequence. If the patient passes shreds of thick matter in the first glass, and the urine left behind is clear, and has symptoms like those of stone, rely upon it it is a case of chronic prostatitis.

The character of the urine in one of the forms of chronic cystitis is well known. There is at the bottom of the vessel a thick mucilaginous deposit, which does not issue in a stream, but falls out in a mass. In another and very common form of chronic cystitis, it is simply cloudy, without any of the dense deposit described. In acute cystitis the urine is cloudy, and there is a considerable deposit of pus. In stricture of the urethra, unless chronic cystitis has been set up, there is no deposit from the urine. Here the character of the stream is important. If, when the patient is passing urine, you see a very thin, small, spluttering stream, or urine issuing only in drops, you will know that there is an obstruction, most likely stricture; because, although in hypertrophy of the prostate you may have the stream much diminished, it will be a stream which falls downwards from the organ. In stricture, force may be brought to bear on the stream, so that, however small it may be, it is often fairly propelled; but in hypertrophy, in which the expelling apparatus is involved, the muscles can-

not act, and, therefore, however large or small the stream, it generally falls perpendicularly. In calculous disease of the bladder there is nothing to note about the nature of the stream, except that it stops suddenly sometimes—by no means a constant symptom. With regard to the débris of tumours found in the urine, the microscope sometimes, not often, throws light upon their nature. No doubt you may see cancer-cells in the urine, but it is difficult to identify them. I have seen such cells declared to exist by good observers in cases in which cancer was not present. Young pavement epithelium is easily mistaken for them. Going upwards from the bladder, we may note pyelitis, more or less chronic—a disease in which the condition of the urine is only one symptom among many others which must be observed before arriving at a conclusion. In all cases you will ascertain with precision if albumen or sugar are present in the urine, and not make the common blunder of inferring organic disease of the kidneys, when the source of albumen is pure or blood, which may have issued from any part of the urinary passages.

The next question is, "Do you pass blood?" and this will bring you very near indeed to an opinion on most cases—not quite, because in any case you may first have to sound. In prostatitis there is often a little blood at the end of micturition, as in stone; in cystitis there is not necessarily blood, unless it is acute and far advanced; in stricture of the urethra there is not necessarily blood; and in hypertrophy of the prostate not necessarily. You may have it or not, often only as the result of instruments. It tells most in the question of stone. Just as in phthisis a large proportion of patients have hæmoptysis at some time or another; so in about the same proportion of cases—

say four out of five—there is some blood with vesical calculus.

I want you to pay particular attention to these questions, because I shall assume acquaintance with them to underlie much of what I have to say hereafter. What I wish to add with regard to observation by the eye, by the hand, and by instruments will come under each particular subject hereafter, and I will only briefly allude to it to-day. By the eye you observe mainly whether the bladder is distended or not, and you are assisted in ascertaining this by palpation and percussion. The lower part of the belly is often exceedingly prominent in cases of retention. You examine the perineum and scrotum also, with a view to extravasation of urine, perineal abscess, fistula, &c.; and you acquaint yourself with the condition of the prostate and bladder by introducing the finger into the rectum. And now we come to the question of instruments. Suppose such a case as that to which I have already referred, in which there are frequency of passing urine, pain at the end of micturition, pain on any considerable movement, thickening of the urine, blood passing occasionally, but more on movement—you regard it as highly probable that the man has stone. You cannot arrive at a certainty without instruments. You may have almost all these conditions produced by certain changes of the kidney and in renal calculus, and you cannot distinguish them unless you skilfully explore the bladder with a sound. When I claim great value for this instrument, quite understand that I am by no means desirous that in the case of every patient who comes to you and complains of some frequency in making water, or pain in the act, you should say, "Lie down, and let me pass an instrument." Perhaps the surgeon may be apt to abuse a little

his power of passing instruments: it should never be done unless it is absolutely necessary. I hold that an instrument, *per se*, is an evil—a very small one or a considerable one, according to the manner in which it is employed—and that it is never to be used unless there is good reason to believe that a greater evil is present which it may mitigate or cure. But when your patient has the symptoms named, you will be doing him an injury unless you resort to it. In cases of stricture the instrument is also necessary; and so in ascertaining the condition of the bladder, whether it is full or empty. A man may make water very frequently, strain hard, and be very certain that he has emptied the bladder, and be quite deceived. How can you tell? You find a prominence above the pubes which you have no doubt is a distended bladder; but it is just possible that it may be a solid tumour. You cannot know whether the bladder is emptied unless you pass an instrument. Many a man has had an instrument passed into the bladder, and a quart of urine has been found to be left behind, when his own sensations led him to believe that he had expelled every drop. We shall see more of this when we come to the subjects of retention and hypertrophy of the prostate.

As we are now on the question of diagnosis, I take the opportunity of showing you that the eye may be assisted to a certain extent by what is called the endoscope, which is simply an instrument that we have long been in the habit of passing into all the cavities of the body—the ear, the vagina, the rectum—for the purpose of bringing reflected light to bear upon the interior of those cavities. For some years past this instrument has been employed for the urethra. It is more than twenty years since I first saw the endoscope so applied. This was in the hands of Mr. Avery, of the

Charing Cross Hospital. As I was turning my attention somewhat to this subject, he asked me to see some of his patients, and a new instrument he was then making. He showed me a long tube, precisely similar to this which I hold in my hand, with certain arrangements enabling one to see deep portions of the urethra. He showed me cases of stricture, but I do not think he looked into the bladder. He paid a great deal of attention to the subject, and the instrument was brought by him to a certain state of perfection ; unhappily, however, his death occurred shortly afterwards, and the thing was lost sight of here. Various attempts have been made with the same object, long before and since, but I do not know that there is anything on this table very superior to what Mr. Avery showed. Within the last few years M. Desormeaux, of Paris, has paid great attention to the endoscope, and has perfected one of his own, consisting of a similar tube, but with different appliances. The various modes in which light is applied constitute the differences between the various kinds of endoscope. In all of them there is a tube of this description to pass into the cavity. Ten years ago I had an endoscope of M. Desormeaux's, and exhibited it in the hospital—the instrument which you see here. Dr. Cruise, of Dublin, has brought it to greater perfection, and has produced a better instrument than we heretofore possessed. This also is here, and you have often seen it in the wards, applied by me both to the urethra and to the rectum. I may tell you at once that if a man has a good and a tolerably practised hand, with a fair share of intelligence, I do not think he will gain a great deal by the endoscope ; and if he has not, I think it will be of no use at all. There are some few cases in which he may find it of value ; but do not expect that the endoscope

is going to work any marvels in the diagnosis of surgical diseases of the urinary organs. In nineteen cases out of twenty you ought to be able to arrive at the necessary information without it. And it is not the easiest thing in the world to apply. As already remarked, a man should not be put unnecessarily to the pain and inconvenience of a sound or a catheter; but examination by the endoscope is a somewhat more irritating and tedious process. In certain exceptional cases, in which you are unable to arrive at a conclusion without it, you may employ it to some advantage. Now, here is a patient on whom I have never used it, and whose case will offer a certain test of its power. The man before you had an exceedingly bad stricture of the urethra, which I cut internally last Tuesday week. He is now perfectly well. He could not pass a drop of urine before the operation, but now he is able to pass it naturally; and you will agree with me that a great deal must have been done last Wednesday week to make that change. I cut through the strictures deeply, and now we shall see whether we can find the cicatrices. I shall use Desormeaux's endoscope, illuminated by Dr. Cruise's lamp.—You see we have now made a careful and prolonged examination. The urethra is of a more dusky red about the part which has been affected, but that is all which can be observed. Changes in the colour and texture of the mucous membrane of the urethra and bladder are those which are most easily seen, and which are of the most importance to note. The orifice of a stricture may be sometimes seen, but the result is without practical utility. A stone in the bladder may be easily seen, or rather the small portion of it upon which the end of the sound impinges; but I have never gained anything by the sight. A calculus smaller than a pea may be easily found by delicate

sounding, and an audible note elicited from it, more easily than you can see it through the endoscopic sound. I may mention that no one has yet been able by its means to identify the verumontanum, and if you cannot see the verumontanum, I think it is quite possible that minute pathological changes will often escape you.

A very simple endoscope has been designed by Mr. Warwick, which may be used with ordinary gaslight or with sunlight. It certainly seems, on comparison, to effect nearly as much as the larger and more elaborate instrument.

LECTURE II.

STRICTURE OF THE URETHRA.

LAST week, gentlemen, the subject of the lecture was rather general than special. In commencing this course, I shall take to-day the subject of stricture ; and I do so because, if not really one of the most common of these disorders, it is often supposed to be so. Among the many complaints of this class respecting which you may be consulted, perhaps none will be more talked of than urethral stricture. It does not follow, however, that stricture is really so common ; in fact, it is much less so than many suppose. The word happens to have been popularized, and therefore, when a person experiences a little trouble in passing water, he is very apt to say that he has stricture. Certainly, in three out of four cases in which persons do so, I find there is nothing of the kind, but often merely some temporary cause of irritation. Then it must be confessed that there is some confusion, even amongst the profession, as to the mode in which the word " stricture " should be employed. It is said—and formerly I said it myself, because I originally adopted the conventional classification—that there are three kinds of stricture—organic, inflammatory, and spasmodic strictures. Now, it would save some confusion if we employed this word for only one kind—namely, organic stricture. And what is organic stricture ? It is a deposit of lymph round

the canal of the urethra at some point, which, not allowing the canal to open to the stream, narrows the current *pro tanto*. There has usually been some chronic inflammation, most commonly in the bulbous part of the canal, and a deposit of lymph has taken place in the submucoous and in the vascular tissues surrounding the urethra ; and after this lymph has existed some time, it contracts and forms fibrous bands more or less encircling the canal. We talk of the *contraction* of the canal ; but this is due to a popular and not very correct notion of the matter, although it answers well enough for all practical purposes. You will do well to remember, in connection with the pathology and treatment of urethral diseases, that the urethra is not an open tube, like a gas-pipe, for example, into which you can pour fluid. Indeed, the passage is not a tube at all except at the moment of its distention by an out-flowing current ; it is always absolutely closed by muscular fibres, and only when it is habitually prevented from fully dilating to the stream of urine is it strictured.

And this organic stricture is a permanent condition. Once acquired, it cannot be dissipated by any known means. It cannot be removed by absorption, although the contrary has often been affirmed. You may dilate it, you may cut through it, but there it will always be. When a man once has true organic stricture, he has it for ever. If any exceptions exist, the rarity is so extreme as practically not to invalidate the axiom laid down. Whatever treatment you employ, there is always a tendency more or less to contract afterwards.

Now touching "inflammatory stricture" and "spasmodic stricture." Inflammatory stricture is merely a temporary local inflammation of some part of the canal, which is then

narrowed for the time. The patient is unable, as long as that inflammation lasts, to pass water, or at best with difficulty. An inflammation with this result affects only the prostatic part of the urethra, which is not, as you know, the seat of organic stricture. If you call this condition stricture, you may as well say that the throat is strictured when it is inflamed and the tonsils are swollen. We only speak of stricture of the oesophagus or gullet in reference to a condition which is organic, when by some deposit the passage is permanently narrowed, and we never speak of stricture there under any other circumstances. So with regard to spasm. The urethra may be narrowed to a certain extent by spasm—that is to say, the water may be prevented from passing outwards from the bladder, because there is some irregular action of the muscles around it. But the affection is only temporary; it does not necessarily imply any organic change; although sometimes its occurrence depends on the pre-existence of organic change, yet this spasm is not stricture of the canal. I will tell you what spasmodic stricture is. It is an exceedingly useful excuse for the failure of instruments. It is a "refuge for incompetence." When you cannot pass a catheter, when you find it exceedingly difficult to get anything in, and in fact wish to desist, it is a convenient thing, and has always been so recognized, for the doctor to say, "There is spasm." Indeed, I believe he often "lays the flattering unction to his soul" that it does exist, although, in my opinion, it does not, or at least very rarely. "There is spasm," says he, "now in the muscles, and it will be prudent at present to desist from further attempts to pass an instrument." And no doubt when this is said it is so. Now, I do not think that you ought ever to fail in passing an instrument because

there is spasm. Spasm may prevent the urine from going outwards; I do not know that it ever prevents the instrument from going in. In most cases it is failure of the hand, not spasm of the urethra. Still I cannot deny that it is a useful excuse—that it has a sort of foundation in fact, and may thus be often a better explanation for the patient than anything else, when the instrument does not pass. But when we speak here of stricture in future, we shall refer only to organic stricture, in the sense already described. All the mechanical treatment which I shall have to speak of will have reference only to that kind of stricture. In "inflammatory stricture," of course, you have no occasion for instruments, unless retention of urine is present.

Now, what are the symptoms of stricture? First, of course, there is the smallness of the stream depending upon the narrowed state of the canal. Whatever the narrowing of the canal is, in that proportion there must be a narrowing of the stream. Still, it is not to be forgotten that the degree of narrowing varies much with external circumstances, cold, errors in diet, and the like; one thing only is constant, the stream is always smaller than natural. Next, there is often some straining to pass water, corresponding to the obstruction of the passage; and the stream itself is flattened, twisted, or divided. This is accompanied by pain at the seat of stricture, and sometimes also over the pubes, if there is any cystitis. Associated with these also, it is common to have a little discharge from the urethra; indeed a gleet is often the only thing which the patient notices at first, and the surgeon, finding that this is not readily cured, uses an instrument and discovers stricture. Frequency of making water, as I told you last time, is not always present

in stricture, although it always is so when the case is severe and of long standing.

Supposing a patient to apply to you with all these symptoms, you endeavour to see him pass water. He will probably lay some stress on the fact that it is twisted or divided. Do not attribute much weight to this circumstance by itself, for a twisted stream often occurs when there is no stricture. It may be due to an alteration of the external meatus ; for as the stream issues from the passage it is modified by the shape or rigidity of the external meatus, and after repeated inflammation there, the lips of the meatus may be slightly thickened, and permit only the exit of urine in a flattened and consequently twisted stream ; and this is by no means an uncommon occurrence. But in such a case, however flattened the stream may be, the absolute bulk or volume of the stream is not diminished.

We now come to the important point of diagnosis. One rule is to be invariably followed : whenever you examine for stricture, take a fair-sized instrument, say No. 8 or 9. The patient may remonstrate, and will probably say, "That won't pass ; it is useless to employ so large an instrument." Tell him that you do not propose to pass it, but only to discover where the obstruction is. For if you use a small instrument at first, it may pass through the stricture, if one exists, without detecting it ; but if the large instrument goes on easily into the bladder, you have the satisfaction of telling your patient that he has no stricture, and you look further for the cause of the difficulty. Whatever, then, a man may tell you, and however small the stream may be, take an instrument not less than No. 8 or 9, pass it gently down the canal, and if there is a stricture, the instrument is arrested, and you will find the exact position of the obstruc-

tion. Notice the point where it exists—four inches, or five, as the case may be, because it will be useful afterwards in dilating to know its exact locality. But your instrument may stop at some point, and still there may be no stricture; before proceeding, then, to consider other means for prosecuting the diagnosis, I must take some pains to explain how this may happen.

I shall warn you that, in passing the instrument, it is quite common to meet with circumstances which may mislead you. I have spoken to you of error on the part of the patient, and I am bound to say that the surgeon who is not much practised in these matters may also be deceived. What are the sources of fallacy to which he is exposed? How is it that he sometimes fancies there is stricture when there is not? There are some kinds of practice in which you may be hereafter placed, that do not afford the opportunity of often seeing this disease, and in such it is no great discredit to a man to think that he has found stricture when none exists. Not, of course, if he is a professed surgeon; then it will be a great discredit to him. But if he has very little to do with this kind of thing, he may encounter some difficulty with an instrument in the urethra, and he may suppose, but erroneously, that it is due to stricture. Now, I want to guard you all against this; for, though you may not all be operating surgeons, I want you not to leave any course of lectures which I may give, without knowing precisely what are the sources of fallacy, so that I may not hear of any of you hereafter making such a mistake as that to which I have referred. Let me remind you again of what was said about the urethra being a closed canal. I am not going to draw you a diagram of the urethra such as you see in anatomical books, in which it is represented in section as an

open passage ; for it is never in that condition except during the brief act of micturition. First, close to the meatus is a source of fallacy—I mean the lacuna magna. Then, here, five or six inches further on [a diagram referred to], the bulb joins the membranous portion, and the canal, from being wide or dilatable, becomes less so. Lastly, there is a source of difficulty at the neck of the bladder. Those are the three points at which persons may be mistaken in passing an instrument, and form erroneous notions in consequence respecting the presence of stricture.

Now, whenever you pass an instrument, bear in mind that the urethra, so far from being tubular, is merely a sinuous passage with soft, delicate, and vascular walls lying in close contact with each other ; so that nothing is easier, when traversing it, if you are out of the line, than to find some obstruction in the folds or lacunæ of the mucous membrane, since it has more distensibility at some points than at others. If you make a transverse section of the urethra, you will see that the walls are disposed in four or five longitudinal folds, which lie closely applied to each other, and that there is, in fact, in its quiescent state, no open passage at all. Of course, if it were simply an open tube, there would be less difficulty in going on ; but, as it is not so, the point is liable to hitch against the soft parts, or be caught in these folds, on one side or the other. First, as I have said, it is quite possible to get stopped at the very outset, which is embarrassing to a beginner, by engaging the point of the instrument in the lacuna magna. Whenever, then, you begin to pass an instrument, let your first thought be to keep its point on the floor, so as to avoid that obstacle. You wish, of course, to pass it well for the patient. Perhaps he has had instruments passed before, and you desire to succeed at least as well as

the preceding operator. Now, there is nothing which a patient appreciates so much as the easy passing of an instrument. It is a disagreeable operation, and if you pass it more easily than other persons, you will probably retain your patient as long as he requires assistance of that kind. If you stick and get into the lacuna magna at the outset, he infers you to be a bungler, and perhaps will not come to you again.

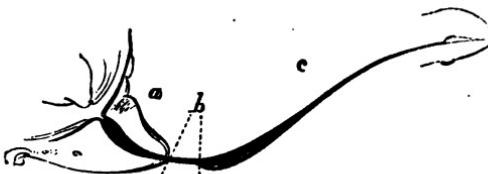


FIG. 1.—Diagram of urethra in natural condition, *a*, *b*, and *c* representing the prostatic, membranous, and spongy portions respectively.*

Now you see represented in this diagram the bulb of the urethra. The canal is more distensible at this point, and when you come to the deep perineal fascia the canal is much less distensible. Practically, therefore, it is much wider in the bulbous portion than it is at the orifice, and when you get the instrument to that part it is apt to hitch. This is the place where almost all the false passages are made : the instrument is driven out of the canal down below the urethra, it being mainly at the floor that the canal is so distensible. The section of the corpus spongiosum is wider below than above ; the texture is soft and spongy. The urethra corresponds in distensibility to the soft structure

* The urethra should have been shown here as it really is, a closed canal ; the line in the bulbous and prostatic portions having been made by me merely a little thicker to mark (*diagrammatically*) position and the character of dilatability. This line has been somewhat exaggerated by the artist.

outside, and although the instrument gets smoothly down to this point, it may not go on into the membranous portion. Now, take care, at first, to get the point of the instrument so turned up as to avoid this lower part. Nothing is so good as a well-curved instrument to avoid that obstacle. I am in the habit of doing this in the case of out-patients. I like to take a student who has never passed an instrument before, and I say to him, "Pass this bougie (a straight or slightly curved one) into the canal." He passes it, and invariably, when he arrives at the membranous portion,



FIG. 2.—Bougie, with point turned up.

stops. I then take the same instrument, give its point this form (Fig. 2), and then he passes it immediately into the bladder. This is the form which is made prominent in the instrument called "coudée" by the French, and a most useful instrument it is. Sir B. Brodie recommended this small bend to be given to a bougie for the same purpose more than thirty years ago. As the instrument goes in, it keeps close to the roof, instead of engaging itself in the distensible part of the bulb.

The last obstacle is at the neck of the bladder, and so common is it, that you often hear of "stricture of the neck of the bladder"—a thing which never exists. There never was a stricture even in the prostatic portion. "Stricture at the neck of the bladder" was a household word some years

ago, and even now you sometimes hear of it; but there is no such thing. It is simply because there is sometimes difficulty in passing the neck of the bladder that it came to be regarded as a locality of stricture. In this case also a well-curved instrument is the best thing to pass in. Let me recapitulate shortly the three sources of difficulty: First, the lacuna magna, which is avoided by keeping on the floor of the canal; then the narrow membranous portion at the bulb, which is avoided by keeping the point of the instrument well up; and the same with regard to the neck of the bladder.

To return now to the prosecution of our diagnosis. We have found an organic obstruction to the bougie, say at four and a half inches from the external meatus, but we are ignorant of the extent of the narrowing; you know the patient has stricture, but do not know its calibre. You will ask him to pass water, and if he can do so naturally, the size of the stream will enable you to infer the amount of obstruction. But more probably he cannot do so in your presence. You will then take a small gum-elastic instrument, say No. 1 or 2. You pass No. 1, and that perhaps goes through easily; then No. 2, which goes not quite so easily; then No. 3, which goes in tightly. No. 3, then, is the calibre of the stricture. Now you have all the main facts about the stricture that you want to know. The man's general condition, the frequency with which he makes water, the amount of chronic cystitis—all these are questions to be considered; but it is only with the mechanical part that I have to deal to-day. But he may have more than one stricture: an exceptional but by no means uncommon case. If so, the first obstruction is almost certainly near to the external meatus. It may be in any part of the anterior

three or four inches of the urethra, often about two and a half inches down the canal. At this point the exploring bougie stops, and when you have passed a small instrument through the stricture, you pass onwards to seek another, the facility for doing which is much interfered with by the grasp of the first stricture. Take then an instrument with

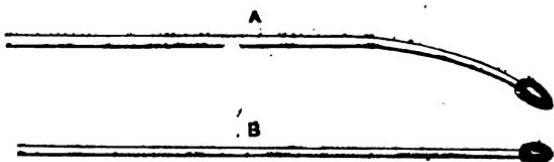


FIG. 8.—(A) Curved and (B) straight bulbous-ended sounds for the diagnosis of strictures.

a very slender shaft, and a small bulb at the end of it (Fig. 3). It may be flexible or metallic; perhaps the latter is the better of the two for most cases—the bulb being of a size to pass rather tightly through the stricture. Having got it carefully through, it moves on easily enough until the second stricture, if there be one, is encountered and perhaps passed. Then, on withdrawing the instrument, you may easily recognize each point of obstruction, by the little check to the bulb as it passes through on its way outwards. This is by no means a necessary proceeding: with a little practice it is easily dispensed with, only it is necessary for you to know and understand the process, so as to be able to apply it when requisite.

We now come to the question of treatment. Supposing a man has but one stricture, and that in the bulbous portion, or if he has two, that the anterior stricture is by no means very narrow or resisting; what are we to

propose to do for him ? First and foremost, dilatation—dilatation always—dilatation without exception, whenever it will succeed. It is always to be tried first, because it is the simplest and easiest mode. If you find a man with a stricture ever so narrow or tight, by no means think of operating till you have tried whether dilatation will succeed. What is dilatation ? A mechanical process of stretching this organized lymph, which forms bands round the canal at the strictured point. It is often said to produce absorption of this tissue, which I shall not deny, but only say that there is not the smallest particle of proof to support the notion. Now, suppose you have been able to pass No. 3 bougie or catheter rather tightly through the stricture and into the bladder, to be perfectly sure that all has gone right, then you say to the patient, "That is enough for to-day ; come again in two or three days' time for a larger instrument." Now, I advise you, on such second or third day, not to commence with the largest instrument previously passed. Having passed Nos. 1, 2, and 3 on the first occasion, you should now take Nos. 2, 3, and 4 ; and on the third occasion, 3, 4, and 5 ; and so on ; always beginning below the point you had attained on the previous occasion, making the smaller instrument a sort of *avant courier* for the larger one. Further, never let the instrument remain in the urethra ; withdraw it at once ; leaving it there simply increases irritation, and does not augment in the slightest degree the dilating power. Thus you find that the longer you leave it the tighter it is held, and the more difficult and painful it is to withdraw. Not until it has remained in the stricture an hour or two does the stricture begin to relax, as we shall see by-and-by, in considering "Continuous Dilatation."

Now comes the question of the kind of instrument to be employed. The great principle which underlies all mechanical treatment of the urinary organs, whether for stricture or for hypertrophied prostate, for retention of the urine or for stone—the one great principle which must decide for us the question of the kind of instrument to be employed is this: *all instruments are to be considered evils, more or less, never to be resorted to unless a greater evil be present.* The passage of an instrument of any kind into the healthy urethra must *per se* be a source of irritation. Try it yourself; and I advise you to do it, if you wish to pass an instrument well; for I hold that no man should pass an instrument for another until he has passed one for himself. Of course the amount of irritation will depend in great part on the manner in which it is passed, and on the kind of instrument employed. Let us consider, to use a commercial simile, that in the case of your patient there is a "debit and a credit side" in all treatment. You intend, beyond all doubt, to effect some real good—that is, to the "credit side" of the account; but you cannot do it without making some irritation in order to gain your end—that is an entry on the "debit side." Be careful, then, that you constantly bear in mind the latter fact, and make it your business to diminish that "debit" as much as possible. Do not pass an instrument unless there is some good reason, unless there is some evil, for the sake of curing which it is worth while to incur a little irritation. Acting upon this principle, you will choose such an instrument as you know by experience or otherwise to produce the least possible irritation. And this leads me to the question of the difference between solid and flexible instruments. Here I feel that I am treading on delicate ground; and I will tell you why. First of

all, no one has been a greater advocate than I was some years ago of solid instruments as against soft ones, influenced by the traditions of this place, which are entirely in favour of the former. I can give you the reason for that. The great master-spirit of this place, who has been dead some twenty years or more, the man who gave the tone to the place, and educated almost all the elder men here—I mean Liston—declared his preference for the solid instrument in very strong terms. It is (1867) just twenty-one years ago since I sat in this room and heard him deliver a lecture on that very subject. His powerful advocacy of the silver instrument, and the contempt he had for others, were matters of notoriety. Starting, then, with such views, and regarding him—as every one does, to a certain extent, the man who teaches him well and fairly what he learns—for a certain time as an oracle, I was strongly in favour of the solid instrument as against the flexible. But what is much more valuable than any oracle, whoever he may be, is a large personal experience; and this has taught me that, beyond all question, the flexible instrument is the best—if only you know how to use it—for the treatment of stricture, and for all maladies of the canal, whenever it is available. I am so certain of this, that I have no hesitation in saying that a great part of the success of any man who has much to do with this subject will depend upon his use of flexible instruments as against solid. No patient will ever allow a surgeon to pass for him a solid instrument if you have passed for him a flexible one as easily as you are bound to do. It gives him so much less pain, and produces so much less irritation. To continue my commercial simile,—it puts so much less on the “debit side” of your patient’s case; you get so much more of advantage, and so much less of

disadvantage. I confess, then, to a considerable change of opinion even since I published my first work on the subject; and I do this without the slightest shame or the slightest repugnance. I hold that the end of life in this world is not achieved without change in our opinions. You may rely upon it, with regard to any subject whatever, whether politics, or religion, or our own proper profession, if we hold the same opinions at forty years of age as we did at twenty—and, perhaps, looking forward, I may say, if we hold the same opinions at sixty as we do at forty—we live to very little purpose. It is an error to look for a life long “consistency” in matters of opinion from men who think for themselves, in whatever department their teaching may be. You must expect them to progress, or they will be bad teachers—just as I hope you are progressing now. I have said this because I know that so much might be quoted from what I held fifteen years ago in contradiction to what I am now saying. If I did not state this you might ask me why, having said so much in favour of the silver instrument, do I now say so much in favour of the other. You have my reason: it is simply that I have learned better.

There are two kinds of flexible instruments, the English and the French. Inasmuch as the French instrument possesses more flexibility than the English, I often prefer it. Perhaps it is right that I should add a word or two to what I have said. I believe the flexible instruments are much better now than they were in Liston's time; and I think that, if we had had the good fortune to retain him so long (without taking credit for making a shrewd guess), he would have changed his opinion too. This is the kind of flexible instrument much used in his time. It is called a bougie; and properly, since it is simply a kind of wax-

candle, and is, in my opinion, a very imperfect instrument. You can bend it into any form by warming, but it is a very inferior instrument to what is generally used now. The gum-elastic or English flexible instrument is very valuable on account of one quality which it possesses, and which does not belong to the French instrument—*i.e.* it will preserve any curve, when cooled, which you choose to apply to it under the influence of heat. If I want a small curve, I take the instrument, put it in warm water, give it the curve required, then put it in cold water, and the curve is fixed or set. The French instrument is exceedingly flexible; you may wind it round your finger without difficulty. And it has another valuable character—namely, its peculiar tapering point. Now, a tapering point *per se* is often undesirable in the urethra, because it is very liable to get into some lacuna. It would be an advantage if you could ensure that it did not do this; but this liability is provided against now

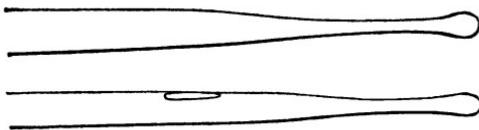


FIG. 4.—The bulbous-ended bougie and catheter.

very ingeniously by means of a little bulb at the end (see Fig. 4). The long tapering extremity guarded by the bulb insinuates itself through the healthy urethra, or through one not greatly contracted, in a most certain and easy manner. Such an instrument as that may be passed by the patient himself without difficulty. Indeed, it may almost be said to be “surgery made too easy.” The merest tyro can pass it in nine cases out of ten, although he might not manage the tenth. It is one of the many extraordinary

instances of English conservatism that these instruments are found in so few hands. They are, however, at last being made here. For years it has been necessary to send to Paris for them ; but a demand is arising now, and they are at length being manufactured in this country. If you will try the experiment on yourselves, you will find that this instrument traverses the urethra almost without your knowing it ; and it requires no knowledge of the canal in order to use it. Now it may appear to you very heterodox, but I advise you, in passing an instrument, to forget all about your anatomy. You are taught it over the way, and it is most important that you should know it ; but, in passing an instrument, forget all about the different regions. Think nothing about the deep fascia, the membranous portion, or the compressor urethræ. A solid instrument is especially dangerous in the hands of an anatomist ; he will push it the way he thinks right, as if all urethras were exactly of the same form, and did not vary as much as noses do, or other features. This used to be the pretext for preferring the solid instrument ; it was said, " You want to know exactly your anatomy, and pass the instrument accordingly." I pity the patient who has a solid instrument thrust into his body by a knowing man at anatomy. You want an instrument that you can use most delicately, holding it lightly between the finger and thumb, withdrawing it or changing its direction as soon as you are able to perceive an obstruction. Your hand is to be educated for the power of delicately perceiving the characters of the passage by means of the instrument within it ; and rarely, if ever, are you to push a solid instrument in any given direction preconceived to be the right one. If you wish to combine the maximum amount of dilatation with the minimum amount of irrita-

tion, this flexible instrument is unquestionably the one for you to use.

There is one other point to notice with reference to French and English instruments,—I mean the gauges. Our numbers are from 1 to 12. Here is No. 12; and you generally consider, when you have reached that size, that you have completed the dilatation. In England, we cannot be said to have a uniform scale; all our measurements are very arbitrary. One maker has one scale, and another another; and the Scotch scale differs by one and a half from the English; so that the patient who takes No. 12 Scotch, takes only $10\frac{1}{2}$ English. Our more exact neighbours over the Channel use the millimetre, and the number represents the precise size, so that when I have named the size,

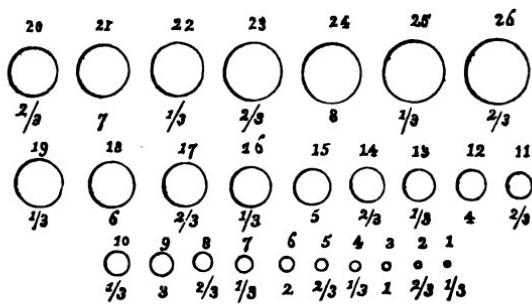


FIG. 5.—French gauge.

I have named the exact calibre or magnitude of the urethra. Instead of 1 to 12, the French have 1 to 80 (*see Fig. 5*). They begin lower, and go higher than we do, and the steps are more gradual. In this way irritation may be lessened. You may pass, for instance, a No. 4 English very easily, and a No. 5 with great difficulty, or not at all, and an inter-

mediate one might be the proper size. Their numbers 3 to 21 are about equal to our 1 to 12 ; showing you at once how much more gradual the range is. No. 1 is one millimetre in circumference ; No. 2 two millimetres, and so on ; so that the increase in size is uniform as well as gradual. If I have a patient who will take No. 21, I know that his urethra admits an instrument twenty-one millimetres in circumference, and, of course, seven in diameter. I advise you in this, as in other matters, to be cosmopolitan in your views, and to adopt improvements from all quarters.

I have told you that simple dilatation consists in passing every two or three days a larger instrument, until you reach the highest. In many cases all goes on smoothly from the beginning to the end. Then you teach the patient to pass the instrument for himself, and he does so afterwards once a month, or once in six weeks, to maintain a sufficient calibre.

I will touch but lightly on "continuous dilatation," or the tying in of the instrument. There is a patient upstairs who is now undergoing it successfully. You have tried, we will suppose, the simple dilatation, and have not made the amount of progress desired ; or, perhaps, the patient's avocations may make it necessary to have a more speedy cure. In either case you may say, "If you can give me ten or fourteen days in your room, not necessarily in bed, but on the sofa quietly at home, I can almost certainly bring you from the smallest number up to the highest,"—that is, by "continuous dilatation." In "simple dilatation" the instrument is simply introduced, and at once withdrawn; in "continuous" you tie the instrument in, and allow it to remain for several days. You tie in a small catheter, which, if possible, is to be gum elastic, and so that it only just enters the bladder. And you should always take care that it is

small enough to pass easily, so that it lies loosely in the canal. Those three conditions being granted, this is one of the safest and best modes of treating stricture. There is a patient upstairs who has finished the process, and to-day the house surgeon tells me that he passed No. 11 with ease. The man has not now the slightest pain or frequency of making water, and he has not been so well as he is now for twenty years. He says he is as well as ever he was in his life ; he came here in an exceedingly bad condition. He had been treated as an out-patient, and making no progress, I advised him to come in, and try continuous dilatation. I repeat, three conditions are necessary to success : you must have a flexible instrument ; the point must not be far in the bladder, and it must not fill the stricture, because, remember, it is not a mere mechanical process ; you do not want to distend the stricture as you would a lady's glove, but you let the foreign body lie in the passage. If you leave a No. 1 in for a sufficient length of time, you will be able, when you take it out, to pass No. 10, without using the intermediate numbers. I believe I was the first person to demonstrate that curious fact ; at all events I never heard of it, and knew nothing of it until I discovered it for myself. In practice you do not leave so small an instrument very long in the urethra, because the stream of urine would soon wash it out, and it is necessary to put in a larger one to fill the canal a little more. If, when you change the instrument, you put in one quite as large as the stricture will admit, you produce pain and irritation, and infringe the principle I have laid down, so that the progress is less satisfactory. In continuous dilatation, as well as in simple dilatation, you adopt the plan which gives the least amount of pain and irritation to the patient, putting as little as possible to the

debit side, and as much as possible to the credit. Well, then, having ceased to tie in any longer, say at the end of six, eight, or ten days, according to the case, you will pass an instrument daily for two or three days. Then gradually increase the intervals of time, maintaining as much of the calibre gained as you fairly can. Most commonly you lose a number or two from the highest point attained by tying in : thus, if No. 12 was so reached, you will probably maintain No. 9 or 10; an excellent calibre for a patient who commenced with No. 1, and that perhaps passed not without much difficulty. It is quite common to observe that the patient has a little fever during the process, but it is rarely considerable. A single rigor, followed by heat and sweating, is not reason sufficient to suspend the process ; indeed, it often happens after the tying in has ceased, and during the first or second day after, when he commences to pass water without the instrument. When long-standing organic disease of the ureter and kidney exists, as the result of old and narrow stricture, then continuous dilatation may provoke severe and dangerous attacks; but this is a condition in which all mechanical interference is hazardous. But supposing all goes well, there are still of course some few cases in which the contraction reappears rapidly, and all that has been gained by the process described is rapidly lost. Clearly, some other method than dilatation will be required for such cases. This subject, which embraces the operative proceedings to be applied to the treatment of stricture, I shall speak of at our next meeting.

LECTURE III.

STRICTURE OF THE URETHRA.

You may remember, gentlemen, that at the last lecture we commenced the subject of stricture, and considered the treatment by "ordinary dilatation" and by "continuous dilatation." You will see at once that this presupposed that an instrument had been passed *into the bladder*. It is, of course, assumed that in treating a case by means of dilatation, whether continuous or simple, the instrument has fairly passed through the stricture, otherwise the stricture is not dilated. But all cases of stricture are not so easily disposed of. It often happens that at the first, second, or even third trial you do not get the instrument into the obstructed part, or only partially so; or it leaves the canal altogether and goes into a false passage. At all events, the instrument does not go through the stricture, and onwards, as it should do, into the bladder. Now that is a condition of difficulty which opens a new subject for us to-day. We have now to deal with more difficult cases, those in which all your care and experience, if you have any, are needed. It was said by Liston, that of all operations in surgery, there were none so difficult, none which required so much patience and care, as the passing of a catheter through an obstinate and very narrow stricture. That statement is in his last edition of the "Practical Surgery" (p. 476), and you can scarcely have a higher authority for the fact there mentioned.

Now there is one word which is often used to describe

stricture, to which I take a great objection, and I think the sooner it is expunged from the vocabulary of surgery the better. Such a stricture as that of which I now speak is often said to be "impermeable." What is impermeable stricture? Why, first, it does not denote a quality necessarily inherent in the stricture at all, but rather the quality of the surgeon. For, you see, a stricture may be "impermeable" as regards A, but not "impermeable" as regards B, who may pass the instrument easily enough. But, secondly, it is a contradiction in terms. Stricture is a *narrowing* of the canal; it is not an obliteration of it. There must be an opening, and if there be an opening there must be room for an instrument; it cannot be "impermeable." It is only a question of the size of that instrument, and of skill or patience in the management of it. The stricture always admits urine, more or less in quantity, to pass through it, and I maintain the truth of the axiom first enunciated by Professor Syme, that whenever urine passes outwards through a stricture, an instrument ought with care and perseverance to be got in. I advise you to believe in that doctrine, not that it is true as regards yourselves at the present time, for I will assume that you have not sufficient experience to be able to pass an instrument through a stricture in all cases. If you are able to do so, I can only say that you are quite out of place here, and need not come to learn. It is exceedingly difficult to pass an instrument in some cases, but after a considerable amount of experience you will find that there are very few in which it cannot be accomplished. In the treatment of stricture, when you have really a difficult case before you, it makes all the difference whether you act under a belief that it is your own fault if you do not succeed, or whether, on the other hand, you hold the dogma

that there are a certain number of cases which are "impermeable" to all surgeons. The man who holds the latter belief will be quite certain in some cases not to succeed, whereas, probably, the man who believes that in all cases an instrument may be passed with time and patience, will be very likely to succeed in all, or at all events will succeed better than the other. "Impermeable" stricture is not heard of so much now as it was twenty years ago. It was fully believed in then, and a particular kind of operation might frequently be seen in the hospitals for it; but I will undertake to say that it is much less commonly done now. The operation consisted in passing a large instrument down to the stricture, and opening the urethra upon it from the perineum, and then getting through the obstruction, or by it in some way, if the operator could, into the urethra beyond. It was very seldom that the true passage was followed, but somehow, by dint of cutting, a way was made for the instrument to go from the urethra before the stricture, to the urethra behind the stricture, and it was not a very successful proceeding. That was acknowledged in all books at that time as an operation for impermeable stricture, or as "perineal section." I have had occasion to perform it three times only in my life; two were instances of traumatic stricture, and I believe the necessity for it to be excessively rare. I have already given Professor Syme credit for having first enunciated that doctrine, and he always stoutly maintained it, to the great advantage of patients who suffer from severe stricture.

But you may have complete obliteration of the urethra, which, as before said, is not stricture. This is very rare; but it occasionally happens, and chiefly after injury in the perineum, as by the breaking of a vessel, or any wound there cutting into or across the urethra. If the opening remains

pervious, and gives exit to all the urine, a cicatrix occurs involving the anterior opening of the divided urethra, which is then closed altogether, and so the canal is obliterated in front of the fistula.

Now, how are you to deal with a really narrow and difficult stricture? I will assume that you have a case in which you have tried to pass an instrument three or four times, and have failed. The first thing you do is to see the patient make water. Your failure to pass the instrument may not have arisen from narrowing of the urethra: there may have been some false passage made. It may be that there is no stricture at all. No greater failures are made than with those patients who have little or no stricture, either from the surgeon not knowing well how to pass the instrument, or from there being a false passage into which it gets, so that it does not enter the bladder at all. You first of all see the stream of water, and judge by that what size of instrument is to be used. And always let the instrument correspond with the size of the stream which you see. It should correspond in this way, however,—it should be a little smaller. You know, of course, that when a current of water passes into a narrower passage than that in which it has been flowing, the stream is more rapid than before, and when the passage becomes larger it flows slowly again; so that the size of the stream as it flows from the orifice is not to be taken as the precise measure of the calibre of the narrowest part of the canal. You should, therefore, take an instrument somewhat smaller than the stream. There is a patient in No. 10 ward, whom some of you have seen, who does not pass a stream at all: the urine is only a succession of drops. How small, then, in such a case must be the instrument that is employed? Then there is one very important thing to be considered in connection with small

instruments—namely, that no more dangerous weapon can be introduced than a very small catheter, unless corresponding care, delicacy, and gentleness are exercised ; indeed, it is impossible to be too careful in employing it. You see how easy it is with such an instrument as that which I hold in my hand to get into one of the lacunæ, or into any false passage, or to drive it through the soft walls of the urethra into the tissues outside : therefore it should always be used with the utmost lightness of hand. You must not hold this slender catheter tightly, resolving to get it through any obstruction ; but it must be held so lightly that if it meets any undue resistance it will slip through the fingers directly —anything rather than wound the urethra. I certainly cannot advise you to try such an instrument until you have had some fair amount of practice with a larger one. In cases of difficulty, a small gum instrument is not often of great service, although it sometimes succeeds, and should always be tried at first. I have been advocating gum elastic instruments as the rule ; but if you have to deal with a very tight stricture, and fail to pass the flexible catheter after one or two trials, you must use a small silver instrument.

Now, one word upon the subject of using force. *Under no circumstances whatever should force be used in the introduction of an instrument through a stricture or into the bladder.* That is my dictum to-day. Years ago it was a matter of discussion how much force should be employed ; more years ago still you heard of people using instruments with great violence. Now I am perfectly satisfied, and I believe all modern surgeons will tell you, that no force is to be employed. It is very difficult to say what one means by force ; but what you are to understand is, that no kind of weight or pressure is to be put on the instrument which

can by any possibility carry it out of the canal; and very little force will do that. The more difficult the stricture the less are you to dream of using force. You will remember that the urethra is possibly of full size up to the point of narrowing, and hence it may be very difficult to find the opening. If you use force, you will perhaps perforate the soft walls on either side, and this done, you have increased your difficulties; because, if you make a false passage, the point of the instrument is much more likely to be caught in it than to pass through the strictured part.

Remember, also, that a stricture in the course of a canal does not necessarily follow the exact direction of that canal. It may be a little tortuous; may be on this side of the axis or on that, not necessarily in the middle. You may see this sometimes in a dead body; and you may infer it from experience on the living. When you have to deal with a very narrow stricture, take a silver instrument which you intend to guide. Do not rely upon mere groping to find the orifice. First of all, it is exceedingly dull work to be constantly groping. You should always adopt some method—any method you please, provided that it shall seem to you exhaustive of the different modes of exploring the urethra. Some of you saw the plan I adopted with a patient to-day; and I believe that to be the best plan. You should go systematically to work, and slide your instrument from the orifice of the urethra down the one side or the other. This diagram will show you what I mean. If I go down on this side I shall probably not get into the stricture; but if I slide down gradually on the other, I shall probably get the instrument in, because you see there is less obstruction on that side. Begin, then, by the roof. The roof is the firmest part, and, by following it, will be most likely to carry the point in. The floor, on the contrary, is the softest,

loosest, and most spongy part ; and will be most likely to yield to the instrument, and give way. If your first effort does not succeed, take the right side ; if that does not do, take the left ; if that does not do, take the floor. I know no other method so calculated to help you through a difficult stricture. If you are very careful, you may make the attempt in this manner for twenty or thirty minutes without doing any damage ; but if you find the patient suffering much, or if he bleeds rather freely, or if you are losing patience, give up the task, for you will probably make a false passage, and increase the difficulty tenfold.

So much with regard to introducing an instrument into a very narrow stricture. Now suppose you have a false passage. Of course I will assume that you have not made one —you will be much too careful for that ; you are perhaps not the first surgeon who has seen the patient ; some one else has seen him before you, and made a false passage. There is that case upstairs, in which the man has made a false passage himself, confessedly, notoriously, because he has taken a large instrument and pushed it completely *into the bowel*. He has used a No. 9 or 10 bougie, and treated himself for stricture. He is certainly an illustration of the old adage, that "he who treats himself has a fool for his patient." He has thrust the bougie out of the urethra through all the tissues between it and the rectum. When he was in the out-patient room he simply complained that when he passed the catheter into the bladder he brought out fæces. The truth is he never went into the bladder at all. I suspected the cause, laid him on his back, and verified it, and, as you know, he is now in my ward upstairs. I have made two prolonged attempts, and I carried a No. 1 silver catheter into the bladder to-day. You can easily conceive how difficult

that false passage must make it to get the instrument in. It is only to be done by being very careful in avoiding the side on which the false passage is. A false passage commences usually on the floor, and, no doubt for the reason mentioned, the structures below being looser than those above. When you examine a patient with a false passage, you may find the instrument passing to its very end, and still no urine flows. Hence the false notion of stricture at the neck of the bladder. When the instrument has thus passed, put your finger into the rectum, and you will know instantly whether there is a false passage; for, if so, there are only the coats of the bowel, which are very thin, between your finger and the instrument, so that you feel it very distinctly; and very commonly you find that it is not in the middle line, but rather to the right or to the left. But if the instrument is in the right passage, you feel the whole thickness of the prostate, not always very considerable, between it and your finger, still quite enough to show that you are in the right path. It is almost always in the bulbous portion that it leaves the urethra and gets under the prostate. What you are to do, then, is to withdraw the catheter two inches or so, then pass it on again, keeping as close along the upper part of the urethra as you can, ascertaining by means of the finger that the instrument is not passing into the old route. It will be very likely to do so, because it is much more easy to get into a false passage than into the right one. I have devoted as much time to this subject as I dare. I have only given you these general hints; you will arrive at the rest yourselves by practice. There is very often a case of false passage upstairs, and I wish you sometimes to verify the position of the catheter when it is in the false passage; to observe, by introducing into the rectum

your finger, how very little tissue there is between it and the instrument. On the other hand, when it is properly passed, you feel the thickness of the prostate intervening. You can only appreciate this by the touch, and will learn very little more by talking of it.

One word with regard to the injection of oil. When you have a very narrow stricture to deal with, instead of oiling the instrument, it is as well for a beginner to throw half an ounce or an ounce of olive oil into the urethra, holding the syringe well round the meatus. It is easy to insinuate half an ounce or an ounce of oil through a very narrow stricture. It lubricates the parts, and sometimes the urethra is distended with the oil, so that, if you can cleverly retain it with the finger and thumb, you may introduce the instrument when you have been unable in any other way. This is worth noting. It does not do well when there is much bleeding, or the tissues are torn, but when it is not so the plan is sometimes useful.

Now, suppose that, following these hints, you have carried the instrument through the stricture; there is a sort of grasp which is quite unmistakable. That is a sensation which you are always very content to have, because, feeling the catheter "held" by the stricture, you know you are through it. But that very "grasp," which you are so satisfied to feel, makes it less easy to manipulate the point of the catheter after it is through the stricture, and you have sources of danger to encounter in the urethra beyond. Thus, the mucous membrane being often reticulated with dilated lacunæ, it is easy to engage the point of the instrument in one of those, and make a false passage. Be careful never to use force in this stage, and, even after you are through, to get gently and quietly into the bladder. Here.

is a drawing taken from a case which exactly illustrates this condition. (Fig. 6.)

Let us pursue the case one step further. Suppose you have got your catheter in at last, after much difficulty. Do not pull it out. You will say: "I had trouble enough to get it in; and now I will tie it in at once." It is generally safe to do that, although it is a metal instrument; and you may keep it forty-eight or seventy-two hours before removing it. Do not then be in a hurry to take it out, if the patient is tolerably comfortable. You will be excessively disappointed to be obliged to repeat your task; and it will be very disagreeable to the patient. Keep it in about three days, and then you will mostly be able to change it easily for a gum-elastic instrument.

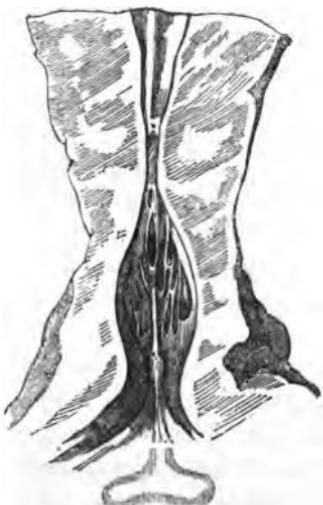


FIG. 6.—Section of urethra, showing very narrow stricture, and dilated and reticulated membranous and prostatic portions behind it. You then go on with "continuous" dilatation, as already described, increasing the size of the gum catheter from time to time. You get up, perhaps, to No. 10, and tell the patient, "This is a great point gained;" but in ten days or so, to your great disappointment, it may be that the stricture will admit nothing larger than No. 2 or No. 3. Now it is clear that you have to do with what is called a "resilient" or "con-

"tractile" stricture. It is not a question of calibre so much as a question of contractility. The narrowing has gone back almost to that condition in which it was at first. You can now only get in, say No. 3. It is useless again to attempt dilatation. This is precisely that kind of exceptional case for which you reserve other means of treatment. Understand that you may have a very narrow stricture, and be able to dilate it, and the dilatation shall be fairly permanent. On the other hand, you may have a stricture which will admit even No. 5 or No. 6 catheter easily, yet the man will scarcely make a drop of water, and you cannot dilate the stricture more than a number or two, do what you will. We had an instance of that in the ward the other day. No. 6 instrument was passed; but the man could make no water until I had operated. These contractile strictures have been the plague of surgeons from time immemorial. If you go back to the old records of surgery—how far back?—some hundreds of years—you will find that these cases have exhausted the wits of surgeons to the present day. All kinds of things have been used in order to overcome the difficulty. I cannot tell you one half of the matters of various kinds which have been put into the human urethra, for the purpose of curing it. I suppose the human stomach has been made to receive more abominable things than any other receptacle in or out of the human body. But if you consult the old surgical authors, or even some modern books, you will see that the urethra has been used nearly as roughly, and that is saying a good deal. Verdigris, savin, the salts of all sorts of metals, everything that could irritate, or that could be imagined to be disagreeable, has been employed to cure these unfortunate strictures. At the present moment I need not tell you that some

surgeons have employed nitrate of silver and caustic potash—not at all mild remedies, either of them. Now the whole question of chemical irritants, as applied to stricture, I shall dismiss with the following words: I believe them to be unnecessary, undesirable, and often injurious. Most modern surgeons, both in this country and abroad, have pronounced against the use of caustics and chemical irritants in the treatment of stricture. I am bound to tell you they have still some advocates: what system has not? I shall not pursue that question further.

Then what have we left? Several mechanical modes: we may rupture, or over-distend, or cut these unyielding and contractile fibres, which constitute the stricture. Urethrotomy, as it is called—division of the strictured urethra by some form of knife—is, perhaps, all things considered, the most universally employed in such cases. Now there are two kinds of urethrotomy—external urethrotomy and internal urethrotomy: the external applied from the perineum; the internal by means of the knife, or some other instrument applied within the urethra.

I speak first of internal urethrotomy. There are two modes of doing it. You may cut the stricture from before backwards, or from behind forwards, the latter being the method most commonly adopted, as being both more certain and more safe than an operation in the reverse direction.



FIG. 7.—A small Bistourie Cachée.

First, suppose you have a stricture at or near the orifice—a very undilatable part. You get in an instrument like

that which I hold in my hand—a small bistourie cachée; project the blade and draw it outwards, dividing the obstruction. Nothing can be more simple. By means of a screw, you can raise the blade to a small or to a large extent. It should be used so as to make a rather free incision, which is perfectly safe. As a rule, the nearer the stricture is situated to the orifice of the urethra, the more necessary is it to cut, and the safer is it to do so. The further the stricture is from the external meatus, as a rule, the less necessary it is to cut, and there is perhaps a little more risk in doing so. All strictures at the meatus, and within, say about three inches of it, which have resisted dilatation—and these generally do so—should be divided. You can dilate them, but the effect is temporary; and you can divide them with ease and perfect safety. This drawing, from a preparation, shows the condition in question. The strictures are laid open after examination, and present the appearance of much larger calibre than really existed during life. (*See Fig. 8.*)

Secondly, with regard to strictures at a distance of five inches, the reason why it is somewhat less safe to cut them is on account of the large amount of erectile tissue at that point. In my own experience of sixteen or seventeen years of these operations, I have only lost one case from internal urethrotomy, either in the hospital or out of it, and I have

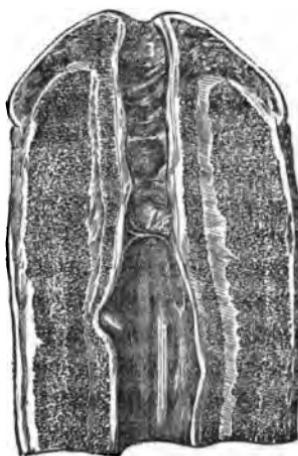


FIG. 8.—Strictures near to the orifice of the urethra.

had a great many cases; I cannot say how many—perhaps two hundred. Sometimes there may be a considerable amount of fever, but very seldom, and, still more rarely, cystitis; much depends, I need not say, on the way in which the thing is done. The one case of death referred to was that of a man in one of my wards last year (1871), for whom I performed the operation as a last resource, and the autopsy showed such an advanced stage of disorganization in the ureters and kidneys, that I am not surprised at the result. If anything has surprised me, it is the extreme safety of the operation, for my earliest belief about it was that it was by no means free from risk, and I hesitated to employ it except in very urgent cases. Now, with my present experience, I never hesitate on the score of danger, for there is almost absolutely none; of course I speak only of that kind of urethrotomy which I employ, and which I shall fully describe in the next lecture.

External urethrotomy is usually known as Syme's operation. It is necessary always, in that case, to pass a small grooved staff or director through the stricture, into the bladder, to cut down upon the perineum, in the median line, and divide the stricture completely by cutting freely into the groove of the staff. The staff has a "shoulder," where the stem, which is about No. 10 in size, suddenly becomes No. 2. This shoulder rests against the face or anterior limit of the stricture, and is a guide to the surgeon as to the part to be incised. The slender portion is grooved, and must be passed with great care into the bladder: a little channel should pass from the groove through the stem and handle, to permit a little urine to issue, and prove that the instrument is properly placed. This proceeding is seldom adopted now, although much done twelve or fifteen years

ago; but other means have superseded it. Occasionally the operation is still performed, chiefly when there are old or large perineal fistulae which require to be laid open. After doing it, a catheter is tied in for forty-eight hours, and an instrument to maintain a good calibre must be passed from time to time afterwards.

It is essential to success in this operation, that the guide should be safely lodged in the bladder, that the whole of the narrowed portion of the urethra should be freely incised, and that during the healing process a full-sized bougie should be passed, to prevent undue contraction afterwards. The error, when there has been one, which I have observed to be most commonly made, is to cut too much backwards towards the bladder, and to leave some fibres of the stricture uncut in the anterior direction.

But during the last few years, many other methods of urethrotomy by internal incision have been devised, as well as other means of forcibly laying open the strictured urethra, which will be referred to in the succeeding lecture.

We next come to the mode of rupture; and here I will show you an instrument which bears the name of Mr. Holt, of the Westminster Hospital. He has brought the instrument into notice, and the mode of using it is his own. It was invented by M. Perrèe, of Paris, more than twenty years ago. He used it mainly, but not altogether, for simple dilatation; Mr. Holt uses it otherwise. He carries it through the stricture, and then, instead of passing at different times a succession of tubes of gradually increasing calibre, he takes the largest tube at once, and forces it down the urethra along the central guide, so as at one stroke to split everything that happens to obstruct the passage of the instrument. Mr. Holt does not tie in an

instrument afterwards. When the operation was first introduced, I was strongly repelled by the violence of the proceeding ; but I examined some of Mr. Holt's cases with him at the Westminster Hospital—now some ten years ago—and was surprised to find how few bad results followed. Hence I tried the plan, and use it occasionally for a urethra which has some two or three contracted points—a condition rarely met with—so as to deal with them all with certainty. Rupture, however, is too rough a mode, in my opinion, for most cases ; and I prefer to carry a fine blade carefully through the fibres of the stricture, and believe it to be the best, and the most enduring in results. But the popular sentiment about a knife cannot be ignored. The British public is not partial to a sharp edge, and is glad of almost any substitute—a feeling one can quite understand. So that it is not always possible to do the best thing, and we have to select that which is next best. You will then, probably, find the proceeding by rupture a useful one when dilatation has failed. That operation suggested to me some years ago a different method—namely, one which I have called “over-distending” the stricture. It is simply this. Here are two blades, as in the instrument used by Mr. Holt, but these two blades can be separated for a considerable interval at one point, and as slowly as you please. In practice, I do it very slowly, so as to rupture as little as possible, and to over-distend as much as possible, the strictures which form the obstruction. There is this fact also to be noted : I wish you to remember that the bulbous part of the urethra—the usual position of stricture—is also the most distensible part in the natural condition of the canal. Supposing the external meatus to be about No. 12 (English scale) in calibre, the bulbous urethra admits at least No. 20 or 24. Hence

it follows that no kind of dilatation or operation which is limited in extent by the size of the external meatus, more than half restores the urethra which has a stricture at the bulb. It is on this account that I distend the contracted part to at least this, or even to a larger size, or rupture it if I please, by means of the instrument in question. I have now used it many times, and it is certainly attended with good results. It is to be used only for strictures within the bulb. I have heard that it has been employed for those within three inches of the meatus: it is a mistake to use it for such, which, as I said before, ought to be cut. This operation requires more care than the other. Mr. Holt's operation needs no care after the instrument is once in place; it is extremely easy to use it. If you once get the instrument in correctly, a single impulse of the hand forces the tube through; and it is certainly tempting on that account. And for a considerable time afterwards you have good results from these operations. I think, however, that internal urethrotomy gives results which are more enduring than any other; but it is infinitely more difficult to perform properly, and, without doubt, it requires a practised hand.

One thing is very necessary before you cut a stricture, namely, that you have an exact idea of its situation and extent. Also, whether there is any other narrowed spot in the canal besides the principal contraction. If No. 11 or 12 pass easily along the urethra for 5 or $5\frac{1}{2}$ inches, rely on it you have only to do with a single stricture. Not very unfrequently you will find a second near to the external meatus, or at a distance of about three inches from it. Supposing that your large bougie stops at either place, and that a No. 7 or 8 only will pass through, you may, if you

please, take a bougie with a bulb at the extremity and a narrow neck behind it; such a bulb as will just go tightly through the narrowed part; having passed it, you feel it free beyond, and, on withdrawing, it marks again the situation and length of the stricture, the latter being usually inconsiderable, and so renders it very evident. With these bulbous bougies, of various sizes, you may determine the existence of any narrowing in any part of the urethra with great accuracy, and for many years I have never operated without employing them carefully beforehand.

Briefly let me, at the close of this subject, remind you that in all cases of impeded micturition, attention to the general health often aids in a considerable degree to mitigate the local troubles. Do not overlook the state of the digestion. If this is unsatisfactory, if the bowels are unduly constipated, the troubles of the bladder and urethra will be much increased; and frequently it happens that a mild mercurial, followed by a dose of Glauber's salts, or of Fried-richshall water, in the morning, gently unloads the liver and bowels, and greatly relieves the most distressing symptoms. Then take care of what your patient eats, and more especially let his alcoholic drinks be in moderate quantity, and of the mildest kind.

There is only one other word I have to say: do not be partisans of any single method. You hear one surgeon say, "I always follow such and such a method: there is nothing like it." Or another, that he always adopts the proceeding of M. Civiale; and a third that of M. Maisonneuve, and so on. There has been great fertility in inventions of this description, especially in Paris, and you may see from several of them very excellent results. Do not confine your selection to any one method, whether I or any one else recom-

mend it; but have every resource at your disposal. If you have much to do with stricture, or with such complaints, I can only tell you, you will want all the resources within your reach. Consider them carefully, and select for each individual case that method which appears in your judgment to be best adapted for it.

LECTURE IV.

A RÉSUMÉ OF THE ENTIRE SUBJECT OF TREATMENT OF
STRICTURE, WITH ESPECIAL REFERENCE TO INTERNAL
URETHROTOMY. [NOVEMBER, 1872.]

GENTLEMEN,—During the last few months many cases of stricture of the urethra have come under our notice, of which the most severe and obstinate have been admitted into the wards. I propose now to utilize this large group of cases by giving you a *résumé* of what I think the best modes of treating this somewhat common complaint. You may say, perhaps, that I have done so before, and that there can be nothing new to say. On the contrary, I reply that although the subject is old enough, and has elicited an extensive literature of its own, both ancient and modern, I have two reasons still for discussing it again: the first, that my own experience is larger and more fruitful than it was some years ago, and leads me to somewhat different conclusions than formerly; the second, that in this age of invention new appliances arise and demand our consideration.

I propose, then, to examine the question of treatment only—the treatment of that organic change in the walls of the urethral canal which constitutes stricture, and especially when it occurs, as it most commonly does, at or near to the bulbous part, a region which may certainly be comprised

within two inches of the canal, and which may be said to commence at about four inches from the external orifice. When stricture occurs at the orifice, or within the anterior two or three inches of the urethra, it differs somewhat in regard of the treatment necessary for the common or typical stricture seated further down, but this will be referred to hereafter. Unless specified to the contrary, then, I speak here of the common form thus indicated.

A patient who has not long been the subject of stricture may, as a rule, be successfully treated by simply passing soft instruments, gradually increasing their calibre until nearly that of the healthy urethra is obtained. This is called simple dilatation. The choice of instrument is important. A soft, flexible, conical bougie, with a small bulbous extremity to prevent what would otherwise be the point or apex of the cone getting entangled in one of the many small cavities in the walls of the passage, is, on the whole, the best, at all events, up to a certain stage. But these very qualities of softness and flexibility, which diminish so greatly the disagreeable sensation when passing, and the chance of injury to the patient, and which render these instruments so valuable, constitute them inefficient when you arrive at a point at which the hardness of resistance of the stricture is too great for their power of penetration. What is the next step? What substitute do you employ? Are you to relinquish the process of dilatation, and think of performing any operation? By no means. You will now resort to firmer and less flexible instruments; and there are few which are more efficient or easy to pass, at this stage, than conical steel instruments, which are all the better when silver plated. The sizes which I should recommend you are not to be small—indeed, none smaller than

the following, of which I don't know that the first is not too small for any but very careful hands.

The first, say No. 6 (English scale) at the point, gradually increasing to No. 8 at about two inches and a half from it, as represented here.

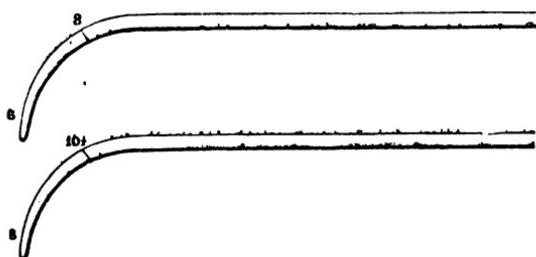


FIG. 9.

The next, No. 7 at the point, and No. 9 at the largest part.

The next, No. 8	"	"	No. 10	"	"
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The next, No. 9	"	"	No. 11	"	"
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The next, No. 10	"	"	No. 12	"	"
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The next, No. 11	"	"	No. 13	"	"
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These conical dilators—I scarcely like to call them “bougies,” a term so inappropriate for metal instruments, and which certainly, if retained at all now that the thing itself, the wax candle of our forefathers, is obsolete, should denote only flexible instruments—may be passed with great ease, owing to their polish and weight; while they can scarcely be surpassed for efficiency in the later stages of dilatation. I recommended them equally twenty years ago, and have in no way changed my mind about them. You may, however, like something intermediate between the very flexible bougie and these metallic dilators; and many means

for combining the flexibility of the former as to the point, and the stiffness of the latter as to the stem, have been contrived—such as gum elastic, flexible metal, &c. Of late I have adopted a plan which I prefer to those, and for all sizes from No. 4 to No. 8 or 9 (English) it is perhaps better than any. I have had a short and very soft lead stylet made, to be introduced at pleasure into the interior of the French conical bougie, and terminating in a fine point, which stops short about four inches and a half from the end of the bougie. Here is a set of them: six in all. The following diagram will explain what I mean. A section shows the movable lead stylet in the interior, but is represented as extending much too close to the end, which should be long and flexible. (Fig. 10.) Their maximum diameters

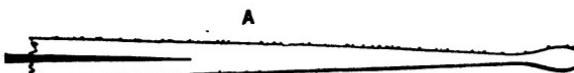


FIG. 10.—Flexible French bougie, with movable lead stylet.

are about $5\frac{1}{2}$, $6\frac{1}{4}$, 7 , $7\frac{3}{4}$, $8\frac{1}{2}$, and $9\frac{1}{2}$ (English)—a series which may well intervene between the soft bougies and the metallic dilators. Capability to penetrate easily is ensured by the complete flexibility of the point, and the increased firmness of all the rest of the instrument.

It may be as well perhaps just to advert to the fact that we require also a delicate metallic instrument to penetrate where a stricture is very small and tight. When I find that no stream exists, that a mere succession of drops is the only method by which relief is attained, I try at first a very small gum catheter, the smallest that handicraft can produce, a No. $\frac{1}{2}$ of our scale; and if with a little coaxing this

cannot be passed—and it very often can, to the great advantage of the patient, since it can be tied in and retained without risk of pain,—I resort at once to a very small silver catheter, the point of which can be guided with great care through the narrow orifice, on the system I have in another lecture described to you, and will not repeat here. If this be safely accomplished, you will do well to tie it in for forty-eight hours or so, keeping the patient quite quiet in bed, and replacing it then, if it is loose, by a gum instrument. You may continue the process of "continuous dilatation" by tying in one after another until you have reached No. 8 or 9, as you will do in a few days, if the patient desires to be dilated rapidly and can give complete leisure to the treatment. If, however, he desires not to be a prisoner, or to continue his avocations, you substitute the ordinary dilatation—that is, the passing an instrument every two or three days, removing it immediately after it has been passed, and letting him go about his business as usual. The early stage of dilatation passed, you will go next to the French flexible instruments, and then onwards as already described.

So much for dilatation. As to the occasional occurrence of rigors and other troubles, I have discussed them fully with you already. The mechanical question is our only subject to-day. But supposing that, although you have succeeded in dilating the urethra up to a fair size, the narrowing rapidly returns in spite of periodically-passed instruments; or that difficult micturition still exists; or that retention of urine often occurs: is it not clear that something further is necessary? In other words, if dilatation proves insufficient, what then? This question I propose now to answer.

The mechanical modes of overcoming a narrow and contractile stricture when dilatation has proved insufficient, may be, for the most part, regarded as of two kinds: rupture or forcible distension of the opposing tissues by power exerted from within outwards; or division by a knife in some form and applied generally within the urethra, occasionally from the external surface.

The method by rupture introduced by Mr. Holt, already described, has been largely employed for the treatment of strictures of various degrees of severity. It is an operation generally involving but little risk, although it has been sometimes followed by fatal consequences. My principal objection to it is that the benefit obtained is certainly not very enduring in severe cases of stricture, and it is for such only that operative measures are necessary.

I cannot say much more for the forcible over-distension proposed by myself, and now practised much, and as it would appear successfully, in America. By both these methods, an admirable result is achieved at once, and the former method especially is so simple in execution that it can be applied by an almost unpractised hand. I am not at all certain, however, that it is an advantage to the patient that an operation should be so easily applicable by an inexperienced practitioner. The consequence has been, and not so very seldom, that the operation has been performed, owing to such inexperience, on patients for whom no operation of any kind was ever necessary.

Another very ingenious method of combining in some sort this power and that of dilatation has recently been devised by my friend Dr. Corradi, formerly of Florence, now of Rome. I place his instruments before you; they obtained for him the award of the last Argenteuil prize at

Paris; and on this ground, if on no other, demand our consideration. The operating instrument consists of what appears to be a small silver catheter, in size about No. 1 and 2 of our scale, which is introduced through the stricture. A screw in the handle is then turned, and a strong wire issues laterally from the lower third of the instrument, forming the chord of an arc with the curved portion, and so distending or partially penetrating—not exactly by incision, for the wire is not sharp enough—into the hard or resisting tissue of the stricture in which it lies. When the operator has exerted as much force as he deems sufficient, he turns the screw in the reverse direction, and so permits the wire to return into the body of the instrument. He then passes a bougie to verify the amount of room gained, and continues the treatment either by simple dilatation or assisted by additional applications of the distending instrument. We will try this in the wards, and you shall see the result. Extremely ingenious as both the idea and the manner of realizing it are, my theoretical objection at present is that it will irritate without dividing an old and hard contraction of the urethra. A stricture which is recent, and not dense and resisting, this method will dispose of I believe at once. But then these strictures present no difficulty to any judicious treatment; while the operation which we are seeking, and the only one we want, as I told you before, is one which shall best relieve the very worst forms of the disease. However, we will give Corradi's beautiful instrument a fair trial, and speedily.

Now for the most severe forms of stricture, those in which after a duration of many years the constituent tissues are so tough and so resilient, that the mere introduction of a bougie only augments the patient's symptoms, I have

found nothing so efficient, so safe and so certain, as internal urethrotomy. I by no means say any kind of urethrotomy. Anything short of complete division of the hardened tissue is not efficient. Over-distend these strictures, or tease them with dilatation in any fashion, and they are rendered more than ever unmanageable, and you only provoke an attack of rigors, and sometimes prolonged constitutional disturbance of a severe kind. For the operation, we have numerous instruments and systems to choose from: their name is legion. Modification after modification has been made of the earlier forms of urethrotome, both by instrument makers and by surgeons, with the view of accomplishing more perfectly the original design, which is that of ability to divide easily, and more or less freely, the hardened tissue.

One of those early forms I still prefer, that of Civiale; I do so on account of its extreme simplicity. With but little of mechanism, it responds like a scalpel to the hand: in fact it is merely a long-handled knife with a delicate little blade at the end, which being passed sheathed to the other side of the stricture, is then drawn through by the operator's hand, and the extent, whether of depth or length of the incision, is regulated with ease and accuracy according to the will of the operator. This, in my opinion, is far better than a machine which makes a certain incision mechanically, and is not controlled and guided by the intelligence of the surgeon.

The method of performing it is as follows: First you will ascertain by measurement precisely where the stricture is, that is, its distance from the external meatus.

Secondly, you must ensure that the stricture is at the time of the operation sufficiently patent to admit the bulb

of the urethrotome to be passed through it. This is an important point, and I must dwell on it for a few moments. Let me remark that the bulb of this urethrotome, as made in Paris, is much larger than it ought to be. The instrument I employ is modified thus: The bulb is only the size of $4\frac{1}{2}$ or 5 (English scale), instead of No. 7, the usual French size. The stem of mine equals in size only No. 3, and the instrument is at least one and a half inch shorter. (See Fig. 11.)

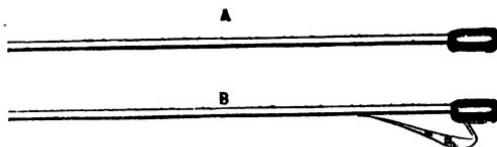


FIG. 11.—Urethrotome described in the text. The upper figure shows it closed; the lower open.

Now, as the stricture which you have to treat probably admits only No. 1 or 2 at most, it is necessary to tie in a small gum catheter for two or three days or more previously, so as to dilate it temporarily, which is always practicable, and bring the stricture to the requisite size for admitting the bulbous end of the urethrotome to pass through it. However contractile the stricture may be, that is, liable to narrow speedily after dilatation, you can always thus temporarily dilate it for our purpose. Of course, if the stricture in question were susceptible of *durable* relief by dilatation, it would be unnecessary to do more, and you would not think of dividing it. Having then arrived at a calibre of No. 4 or 5 by tying in, I prefer to give the patient chloroform. I then withdraw the inlying catheter, and at once pass carefully the bulb of the urethrotome through the

stricture, which usually requires a little gentle pressure and management, when the little bulb is felt free and movable in the urethra on the further side. In this situation, you make the blade project to the requisite extent by means of the simple mechanism in the handle which I show you, and directing the edge to the floor of the urethra, you press it firmly there, and draw it boldly outwards, as if you would make an incision say an inch and a half or two inches in length, so as to divide all the thickened tissues which constitute the stricture. You feel them sometimes offering much resistance. Take my word for it, you need not fear freedom of incision. I never saw any serious harm produced by it, although I have seen less success resulting than I desired where I have not sufficiently divided the stricture, as may have been the case in some of my earlier experiences, and have so left a fibre or two uncut. But I have never had occasion to regret a free and complete division.

Next, you introduce a No. 13 plated sound, not conical, which should go quite easily into the bladder and not be in the least degree "held" in withdrawing it; keep along the upper portion of the canal, and the point of the instrument will not get into the incision. Then take a No. 11 or 12 well-curved gum catheter, and pass it into the bladder, tying it there, in order to retain it, forty-eight hours. It is best to introduce it on a well-curved stylet to avoid the wound, which otherwise the point of the instrument might get into. Of course the stylet is withdrawn immediately afterwards.

Now, in all the operations I have done, nearly two hundred in number, I have never seen any bleeding to signify —sometimes only a few drops appear; on two occasions some extravasation of urine occurred when the catheter became dis-

placed, but not nearly so bad as I have seen following "rupture," and once only an abscess has followed; and you yourselves can also form a judgment, to some extent, of these questions, since you must have seen at least twenty cases of this operation in the wards during the last twelve months. Once only have I seen a death after it, and that was in one of the worst cases of old and unrelieved disease which we have ever seen, in one of my wards about one and a half years ago, in which I used it as a forlorn hope.

It is not uncommon to have an attack of fever, which also happens not unfrequently after the use of the lithotrite, but it is by no means the rule. It appears, if at all, after the withdrawal of the inlying catheter; the first time the patient passes his urine, a drop perhaps enters what remains of the incision, and he has a rigor in an hour or two's time and that is all. To avoid this as much as possible, I always adopt the following plan:—I withdraw all the urine, of course, when removing the catheter forty-eight hours after the operation; order the patient a hot hip-bath for fifteen minutes, and send him back to bed to be well covered up, with instructions not to pass water until he feels a manifest desire. This will probably not occur until six hours after the instrument was withdrawn. He then stands up, makes a full stream, is generally very much astonished at its volume and the ease with which it flows, and goes back to bed as before for the day. Following these precautions, you may hope he will escape the rigor; but, if not, you know, at all events, that there is no risk, and no ground for anxiety. Sometimes, but this is quite exceptionable, the fever is somewhat more severe and prolonged.

The subsequent treatment may be briefly sketched. On the fourth day after the operation, pass a conical French

bougie with a large bulb, so as not by any means to open the little wound. If the point is felt in the slightest degree to encounter an obstruction, withdraw it, and pass a well-curved gum-elastic instrument, which is not conical; the former, however, usually suffices. Again, in three or four days; and No. 11 and 12 mostly pass with considerable ease. After this, once a week, and the patient will pass the instruments himself at increasing intervals, ultimately, arriving at, say, once a month.

This operation gives, I believe, more lasting results than any other. You have seen me perform it for cases which have experienced every known treatment, and have returned as bad as ever. I do not claim for it the removal of organic contraction. That is impossible. The treatment has yet to be devised which will remove absolutely, and for ever, the occurrence of recontraction in a patient once the victim of an organic stricture.

A few words relative to strictures within two or three inches of the external meatus. As a rule, they are very non-dilatable, and the best treatment is incision, p. 52. They are close to the hand, and nothing is easier than to divide the obstruction by means of a small bistourie cachée. No doubt one reason why they are so little acted upon by the simple bougie is, that the urethra here is so little surrounded by spongy tissue, and so much by firm fibrous tissue, that there is really less room for dilating, and less of that soft tissue which exists so abundantly around the bulbous portion. The operation in question is so simple as not to require further illustration here; and the rules I have already laid down for the performance of internal urethrotomy may be held as applying in these cases also.

LECTURE V.

HYPERTROPHY OF THE PROSTATE AND ITS CONSEQUENCES.

GENTLEMEN,—We may pass from the subject of stricture to another very important complaint, and one of common occurrence—viz., hypertrophy of the prostate. It is one which affects a large number of elderly people, and thus the practitioner is almost certain to come in contact with it pretty frequently. Hence the necessity for our studying these cases closely, and the more so because we do not see them very often in the beds here, most of them being treated as out-patients.

Let me first guard you against confounding this complaint with enlargement of the prostate from any other cause. The enlargement, which we call hypertrophy, is quite "*sui generis*." No other organ of the body is similarly affected. It has no relation to, or affinity with, inflammatory deposits, such as we may observe in the swollen tonsil, or in lymphatic glands. The increase in bulk is due to a new formation of gland-tissue, either throughout the organ or in isolated portions. I know nothing analogous with it, except the so-called fibroid tumours of the uterus, which consist mainly of an augmented production of the constituent elements of that organ. So that the new product in the prostate is not a new formation like cancer or epithe-

lioma, and is, in fact, not a "morbid" growth at all, although it induces diseased conditions of the bladder as a result of the mechanical obstruction occasioned by its presence. I make these remarks because I so often observe much confusion of idea respecting hypertrophied prostate. Few people appear to know that there is nothing whatever of relation between it and the enlargement resulting from inflammatory deposit, the latter being essentially a phenomenon occurring in the first half of human life, while the former belongs solely to the latter third.

It was formerly stated, on the high authority of Sir Benjamin Brodie, that "when the hair becomes grey and scanty the prostate gland usually, I might perhaps say invariably, becomes increased in size;" and that is the impression which a large portion of the profession have generally entertained. It was certainly that which was commonly received when I first began to make some special researches in reference to this matter, now some ten or twelve years ago (1868). I was then at the pains to examine after death all the bodies of male patients over fifty-five years of age who died in the Marylebone Infirmary; and afterwards, in Greenwich Hospital, the inquiry was pursued by Dr. Messer and myself. I took care to dissect each prostate very carefully, and discovered that, so far from the presence of prostatic enlargement being the rule, this condition was quite exceptional. I examined about two hundred cases—not picked cases, but all who died consecutively within a certain period, and I found that about one in three exhibited after death some enlargement of the prostate. But of those do not suppose that anything like a large proportion manifested symptoms; for only about one in seven, not more, had symptoms of the complaint. So

that you see it is not to more than one in (let us say) ten men who live beyond fifty-five years of age to whom you can expect to be called to afford any relief for this affection. That, no doubt, is a large number. If you suppose that one man in every ten approaching sixty years of age has symptoms of enlarged prostate, you will see at once how often, if you have anything like a large practice, you may be called to attend to these cases.

We will now consider one or two anatomical points connected with enlarged prostate. This organ is, as you know,

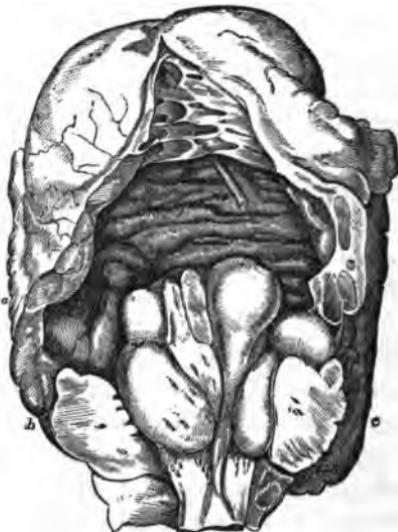


FIG. 12.—Section of bladder and prostate; the former hypertrophied, the latter forming prominent tumours within the bladder.

composed of two lobes and a median portion. Now, the part affected with hypertrophy very much influences the results in relation to the function of micturition. It is not

necessary that there should be much enlargement of the prostate in order to produce very severe symptoms. On the other hand, you may have a very large prostate, and may have almost no symptoms. Almost the largest I ever saw, as big as a small cocoanut, produced very little obstruction to the flow of the urine. Thus, if the median portion of the prostate is only slightly enlarged, there may be retention. Let this figure [diagram] represent the two lobes, and this the median portion. If there is a small nipple-like projection at the median portion, just filling the internal



FIG. 13.—Section of bladder and prostate, the latter forming an enormous tumour. A lateral view.

orifice of the urethra, that may be quite sufficient to prevent every drop of urine passing by the natural efforts. Sometimes there is a considerable enlargement on one side, so that the passage is circuitous; and you will sometimes find

the catheter carried to the right or left, according as the prostate may be large on one side or the other. I show you several examples: these are depicted at Figs. 12, 13, 14.



FIG. 14.—Section of bladder and prostate, showing marked but not great enlargement of lateral lobes and median portion.

You will remember, then, that if you have occasion to examine a patient, and you find a very large prostate, it does not necessarily follow that he should have great difficulty in passing his water; and, on the other hand, although you may be unable to find appreciable enlargement by rectal examination or otherwise, you may not therefore conclude that all his troubles—and they may be considerable—are not due to this complaint.

I will now say a word as to the age of the patients. I never saw an enlarged prostate (I mean, of course, hypertrophy, not enlargement from inflammation and other causes)

before the age of fifty-four; and if I have not seen such a case, you may say that it never or very rarely occurs. The usual time at which it begins to show itself is from fifty-seven to sixty. If a man has it at all he will have it generally by sixty. If he gets over sixty-five or seventy, he may have it, but in a less degree; that, however, does not commonly happen. I have examined the bodies of men at ninety, without the slightest enlargement. You see, then, that it is by no means necessarily connected with age. The man who escapes it at sixty-five will be very likely to escape it altogether, or nearly so.

I speak next of the symptoms. An elderly man comes to you and says that recently his water has not passed so easily; that it has issued in a dribbling stream, and he cannot propel it; that he requires to micturate a little more frequently, especially in the morning—probably two or three times while he is dressing, after which it becomes less troublesome; but during the night it is rather more so than during the day. Then if he does not say much about pain—which, of course, will excite your suspicion of calculus, or some other complaint—you will say, “This is probably a case of enlarged prostate.” You do not necessarily proceed at once to pass the catheter, but you will ask the four questions already referred to. You will ask how frequently he makes water, and you will observe whether the frequency is greater at night than by day, the reverse being usually the rule in stone in the bladder. I cannot tell you why, but it very often happens that patients with hypertrophied prostate pass as large a quantity of urine during the eight hours of night as during the sixteen hours of day, hence the very troublesome disturbance to sleep of which they complain. Under this head you will also inquire whether the water ever passes

without his being aware of it, or without his willing it. In many advanced cases, you will find that some urine passes during a violent effort, such as coughing, or when he is unconscious at night, during sleep. If so, it is probably a case of rather long standing. But if the patient only speaks of the frequency of making water—not inordinate, but moderate frequency—then you ask for pain, and if any, whether before, during, or after the passing of water. If before, and the patient is relieved by making water, it is probably hypertrophied prostate. If it is after, you may expect calculus, which comes into contact with the mucous membrane of the bladder when the water has been expelled; whereas, if he has a distended bladder, as he is likely to have with enlarged prostate, the pain will occur during distension, and becomes less as the urine passes off. Then you inquire about the character of the secretion, whether it is clear or cloudy. In most cases, at the commencement, it is clear. In a great number of cases of prostatic enlargement, although the bladder has not been emptied for months or a year, the water is still clear. On the other hand, if it is an advanced case, the water will certainly be cloudy. And while you are talking of that you will also ask about the stream. You will generally find that it is a dribbling stream, different from the stream in cases of stricture. In stricture the stream is often propelled exceedingly well, although it is no larger than a thread; and so long as there is a stream, the patient can act upon it by will, so as to make it stronger; whereas, strain as he may, in prostatic enlargement, he often cannot influence the stream, except for the worse. It may happen, from the median portion of the prostate being forced by straining into the passage, that the patient voids urine less well the more he strains.

Generally speaking, the expelling apparatus at the neck of the bladder is involved in the enlarged prostate, and ceases to act; so that with all his straining he cannot make much difference, and the stream is not propelled with any force. Then you ask the fourth question: "Do you pass blood?" Usually, in the early stages, the reply will be in the negative, although a little may appear after much exercise, so far suggesting stone. You ask the patient to let you see him pass water, if he can, for that will help you materially. If the stream is such as I have described, you will infer that it is a case of prostatic enlargement.

Then you complete your diagnosis by mechanical means, and for this purpose you will first use a catheter. You should invariably make the patient pass water before you begin, because your object is not merely to ascertain whether enlarged prostate exists, but, what is much more important, what the effect of it is, how far it is a barrier to the exit of urine from the bladder. The important fact for him and for you is not the size, condition, or shape of the prostate, but to what extent is it a barrier to the exit of urine. And it is the quantity of urine left behind which will determine future treatment. I should advise you to use a gum catheter, well curved, and certainly not a small one. As in stricture, always begin with a catheter of not less than 8 or 9, and of course without a stylet. In passing it, keep the shaft well back in the groin, so as to maintain the curve. As soon as you have arrived at the bladder, carefully empty it, and note the quantity withdrawn. It may vary greatly, from an ounce up to almost anything you please. I have drawn off six pints, but that is a very large amount. You may find commonly from six to twenty ounces. To this urine, which you have removed by instru-

ment, and which the patient could not pass by his own efforts, I apply the term "residual urine," and shall thus speak of it hereafter.

Now, with regard to the employment of the instrument for patients with the symptoms described, do not forget that undue frequency of passing water, and still more the passing of it involuntarily, indicate the necessity for the catheter. It is remarkable how common are the errors, not merely of patients, but of practitioners, on this point. They are apt to be misled by the fact that the patient insists, "I do not make too little water; I am making water too frequently, and too much of it, and I am sure my bladder must be empty. Tell me how to retain my water, and I shall be much obliged to you. Don't think of drawing it off." It is surprising how that sometimes influences the practitioner. Nevertheless, these are the very circumstances in which you should pass the catheter and ascertain the fact. Always bear this in mind (and I wish, figuratively speaking, to render that sentence in the largest capitals), that INVOLUNTARY MICTURITION INDICATES RETENTION, AND NOT INCONTINENCE. There are a few exceptions to the rule, but very few. Most of the mistakes that are made on this point arise from the use, or, as I shall show you, the abuse, of the word "incontinence," which means, of course, that the bladder is empty; and certainly, when the bladder cannot hold its contents, its condition is rightly described by the word incontinence. Now, that happens only in very uncommon but well-defined circumstances, such as in some cases of cerebral or cerebrospinal paralysis, and in rare injuries to the neck of the bladder; and in these the urine runs off as fast as it comes from the ureters, the bladder having ceased to act as a reservoir. You see this one

external physical sign is the same in these cases and in those in which the bladder is distended with urine ; that is, there is urine dribbling off by the urethra. But mark how totally different are the two conditions in question : in one the bladder is full, in the other the bladder is empty. Whenever, then, you meet with this involuntary flow of urine miscalled "incontinence," do not confound it with the condition in which the bladder is empty. Rely upon it the bladder is full, and the only way of relieving the patient is by the use of the catheter. I lay great stress upon this, because I have seen lives sacrificed to a forgetfulness of this point. I have made post-mortem examinations of persons who have died from the effects of retention undiscovered during life, and misunderstood because the urine constantly passed off, as it was supposed, "so freely."

Now we know that our views of things, and our consequent acts, are very much determined by the manner in which we use and apply words respecting them, and it is impossible to be too clear and defined in all our language, especially in that which relates to pathological conditions and surgical practice. I cannot express to you how strong my sense is of the importance of this matter ; hence I have made it my constant business to point out the common misuse of terms in connection with this subject.

First, then, the term incontinence, which means the bladder is empty, or "cannot contain," should never be employed by you to denote the phenomenon that the patient's urine flows involuntarily ; for, as we have seen, in that condition the bladder is generally full. It is better to speak of it as "involuntary micturition," without reference to the cause, and when this is found to be distended bladder, to use the term "overflow." Then, remembering always my maxim,

that "involuntary micturition indicates mostly retention, not incontinence," you will never make the fatal blunder I have spoken of, and which I assert to be so common. This, too, assimilates our usage very nearly to that of French surgeons. The French, with their more logical use of language, speak of the bladder as "engorged" and "overflowing," but never as "incontinent," except to denote that rare condition in which the bladder is always perfectly empty. I have, therefore, long been in the habit of denoting a bladder which is full, but allows surplus urine to run off little by little against the will of the patient, as an "engorged" bladder, and the phenomenon thus described as "overflow;" and I hope you will do so too. This brings us, by the way, to another misapplication of terms. In this country, the condition of the organ just alluded to is often called "paralysis" of the bladder, and the unfortunate word leads to mistakes in practice. The bladder is rarely paralyzed. I know nothing of it except as an effect of spinal or cerebral changes. The bladder is never by itself the subject of paralysis, meaning, of course, an affection of the nerves, either central or peripheral. It may be unable to expel its contents, because there is mechanical obstruction, as enlarged prostate, stricture, or impacted stone, or because the muscles have lost their power of contracting from long over-distension; but this latter is "atony." This inability is in neither case due to impaired nervous supply—a subject to be considered at some subsequent meeting. [*Vide Lecture XII.*]

After this digression, which its importance must excuse, we will go on to complete the diagnosis. While the patient lies on his back, you place your finger in the rectum, and examine the size of the prostate, whether it is very tender, and whether the enlargement is more on the right or the

left side. Of course you do this as gently as you can. The finger should be covered with grease and very slowly introduced. The best position for the patient is lying on the back, because you can press the other hand above the pubes, and gentle pressure there brings the bladder and prostate near the finger, and you can ascertain whether the bladder is distended or not. These are the points of diagnosis which it is desirable to ascertain, and beyond these it is not usual or desirable to carry your inquiry.

We shall now come to the treatment. The *medicinal* treatment of hypertrophied prostate may be dismissed in a few words. There is nothing to be done for it—that is, you cannot diminish the hypertrophy. There is often temporary enlargement from congestion ; and that you can do something for. But true hypertrophy cannot be diminished by any known means. Numerous agents have been employed, both internally and as local applications ; among the latter iodine especially. And, notwithstanding all that has been claimed for such agents in certain quarters, I assure you with regret, but with the most certain confidence, that neither iodine nor mercury do anything but mischief, however employed. Besides these, other remedies, as hemlock, hydrochlorate of ammonia, liquor potassæ, &c., have been tried. Nevertheless, I have simply to say that, for the present, we know no means of combating the enlargement itself. But much may be done by way of palliative to the results of the complaint ; and much of this treatment is mechanical. This will consist first in relieving partial retention by the catheter. There are two causes which I shall ask you to consider for this retention of a certain portion of urine which no efforts on the part of the patient suffice to pass. The first is, as you know, the obstruction

itself at the neck of the bladder. But there is, moreover, an inability of the muscular coats of the bladder to contract and expel its contents, and it happens thus. In order to overcome an obstacle to the outflow of urine, the muscular fibres are greatly increased, and hypertrophy of the vesical coat results to a very large extent, just as the walls of the heart thicken when obstruction exists in one of its main outlets. The thickened bladder is much less distensible than the bladder of normal character, and the organ is equally disqualified for retaining much urine or for expelling it entirely; so that the cavity of the bladder is diminished, and its function as a reservoir is impaired, in part by the protrusion of enlarged prostate into the interior, and in part by the rigidity of the coats, as above explained. It is in such cases that the habitual use of the catheter is necessary. Often, as long as the patient lives, he will withdraw more or less of the urine, sometimes all of it, by the catheter. And such a patient may continue to do this for many years, and remain actively engaged in the business of life. And it is by no means certain, if he is well taken care of, that his days are in any way shortened as a consequence. One thing is essential, as in all instances where a daily catheterism is necessary, namely, that the instrument employed and the mode of using it, should be those which effect the object with the minimum of trouble and irritation. The more frequently it is necessary to introduce the catheter, the more essential it is that the easiest manner of doing it should be ascertained and followed. I have reserved, then, for this place what I have to say about the instrument itself. The reason for preferring, as a rule, the gum catheter for this purpose is as follows:—Different curves are required for different patients, and the English gum catheter I will back

against any other instrument, English or foreign, for general use; because, unlike the French catheter, which is admirable for softness and elasticity, you have the power of making it assume any form you like—a quality, perhaps, not so often rendered available as it might be, but which to my mind is of immense service. The instrument-maker generally curves the catheter pretty much in this way (*see Fig. 15*): the point straight and not well curved—the worst form in which

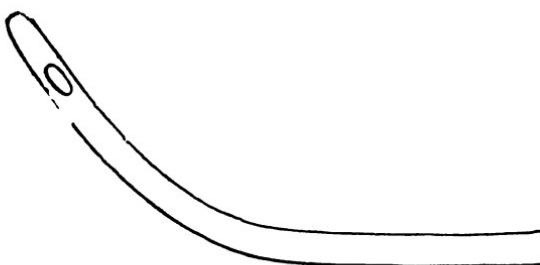


FIG. 15.

you can put a catheter for use. For prostatic enlargement, you require a catheter well curved *to its very point*. You should keep the instrument on an over-curved stylet for a month or so before employing it; and you will then find it easily assume the proper form, when you will pass it, as I need not say, without a stylet. If you require a stiff instrument, a silver catheter should be selected as the rule; not a gum catheter with a stylet in it. To return: you want the point, of course, to be carried over the obstruction formed by the enlarged prostate; and as the heat of the urethra always relaxes the curve, whatever it may be, by the time it arrives at the neck of the bladder, the ordinary gum catheter, as you have it from the maker, becomes nearly

straight, and will not pass over the enlargement. Now, when you have a catheter which has been well over-curved

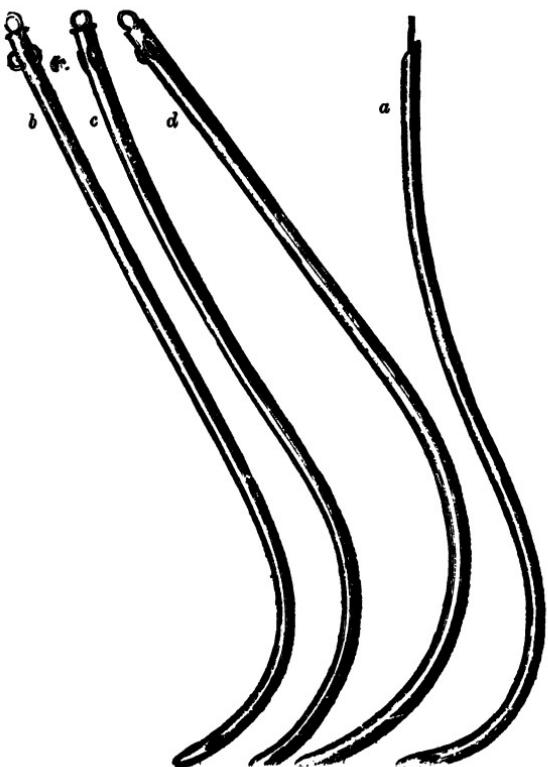


FIG. 16.—*a*, Gum catheter mounted on a stylet of the proper curve for use ;
b, *c*, *d*, silver prostatic catheters of different curves.

for a month or two, you remove the stylet and turn back the shaft, so as to undo the extreme curve and produce an ordinary one. And what happens when you pass it ? In spite of the heat of the urethra, the catheter has a tendency

to curve more, instead of less, as it passes down the passage. And this is precisely the difference between success and non-success. That little manœuvre I regard as of extreme value. It is a very simple thing : keep the catheter over-curved—not for stricture, but for enlarged prostate : then turn back the shaft immediately before using. The curve gradually increases as it goes onwards, and it passes over the enlargement into the bladder. This is so simple that it seems scarcely worth making so much of; but I can only tell you that I know nothing of its kind that exceeds it in value.

Then there is another thing ; you may want a special curve for a particular case. We have silver catheters with various curves (*see* Fig. 16). Here are several which are very useful. But the English gum catheter possesses a quality which, as I have before told you, is not found in any other: put it into warm water and bend it into any form you like; then dip it immediately into cold water, and it will maintain the required form. But the best form so produced may easily be spoiled by your mode of using it. Of course the curve must not be altered while the instrument is passing through the anterior part of the canal, for it is at the posterior part that this form is required ; the shaft of the catheter must be kept closely back in the groin, and the penis brought round the curve, so as to preserve the latter until it reaches the deep urethra, when, by well depressing the shaft, the point will rise over any obstruction into the bladder.

There is one form, however, of the French catheter which renders it a very useful instrument for prostatic enlargement. I refer to the straight, very flexible catheter, the point of which only is just a little turned up, thus termed "coudée," or elbowed; and its utility has been already insisted on in Lecture II., page 28. This instrument is merely pushed horizontally towards the bladder (the patient standing) with

the point turned upwards, and it usually rides over the obstruction with extreme facility (*see Fig. 17*). Sometimes two bends, or "elbows," are given to the instrument, then called "bicoudée," an addition rarely necessary.

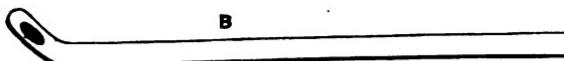


FIG. 17.

The general treatment is not to be disregarded; and here I shall defer a good deal of what I might otherwise say until I come to speak of chronic cystitis, which will occupy a subsequent lecture. Cystitis is associated with so many diseases of the urinary organs, that I may as well refer to the treatment under that head, instead of taking it separately, and recapitulating it in connection with each disease. But, as far as the general treatment of prostatic enlargement goes, the main thing is to prevent local congestion. You must tell the patient above all things to avoid anything like chills affecting the pelvic region, sitting on cold seats, exposure to cold; too much excitement, sexual or otherwise; long journeys, riding in jolting carriages,—all of which tend to produce pelvic congestion, and to interfere materially with the condition of the prostate; since it very readily becomes temporarily enlarged from these causes, and most of the troubles which the patient experiences depend upon them.

One other point has relation to the action of the bowels. You may make a man with enlarged prostate very comfortable if you keep the bowels in gentle action. If he has constipation, and scybala lodge in the rectum, their presence is often the source of great discomfort. Sometimes a simple enema of warm water gives instant relief; but, if necessary, the action of the bowels must be provided for by means of gentle laxatives; such as senna, manna, bitartrate of potash,

sulphur, or by Friedrichshall water or sulphate of soda; anything which will act mildly, quickly, and without irritation, will keep him in a very different condition from that which is associated with habitual constipation.

I will devote the few minutes that remain to those cases of prostatic enlargement in which the difficulty of passing the catheter is considerable, and there is retention of urine. You may have a patient in whom prostatic enlargement has made itself manifested rather suddenly; he may have had symptoms which he has not noticed, but he is suddenly attacked with congestion, he cannot make water, and he is in great distress in consequence. It is not a question how long a time is to elapse before the catheter is to be passed; you should relieve him at once. You find there is a distended bladder, evidenced by dulness of percussion above the pubes. Possibly, before you, others may have tried, and you may be called to pass the catheter in circumstances of some danger to life. Now, in the first place, you should be careful with regard to position. I advise you to pass the instrument with the patient in the lying position first, if the bladder is very large; if it is not very large, perhaps it is as well, or better, to pass it standing. You can empty the bladder better in the standing position; but if you find that the bladder is very large, make the patient lie down before you draw off the water. I have known great mischief arise from drawing off a large quantity of water from a patient when in a standing position. I have even known death occur suddenly from this cause. If I had time, I could tell you of a case in which a charge of manslaughter was brought against a surgeon in a court of justice in relation to such an occurrence. The circumstances were all well known to me, for I was there to defend a brother practitioner, who was

unjustly charged. In that case a catheter had been passed in the upright position, and the patient fell dead from syncope when six pints of urine had passed; just as a patient with ascites might do if you tapped the abdomen in the same position. No doubt it was an error, but nothing could be more monstrous than to make it the ground of a criminal action. It is a very instructive case, and I mention it to show that in cases where the bladder is large, especially in old men, you may have fatal syncope, arising in the way I have described. I always take care, if I find the bladder is large, to pass the catheter when the patient is lying down. Take care also, in these circumstances, to draw off only part of the urine; and after a quart or so has passed, wait a little before you empty the bladder. If you fail to pass a gum-elastic instrument, by all means use a silver one, especially if false passages have been made. The silver prostatic catheter is sometimes essential; that is, one which is much longer and has a larger curve than the ordinary instrument. They are generally made longer than most cases require. Indeed, the common silver catheter, about No. 10, or, at most, one which is only two inches longer, suffices for the majority of cases. Very rarely is the fourteen-inch catheter necessary. Sometimes, when these fail, a catheter with a short beak, like the sound, or lithotrite, will pass easily. And always remember that anything like obstruction at the end can only denote that you are out of your path. No force should be employed. It is not a narrow passage; it may be a little close, perhaps, when you reach the prostate; but if you find any obstruction, you should withdraw and find another route, to the right or to the left. Here, also, let me repeat, never use force under any circumstances whatever.

It may be said, "Why have you not mentioned hot baths and opium?" In cases of retention from prostatic enlargement, there is a serious objection to the expectant method; you must take into account the future condition of the bladder. If you permit the bladder to remain over-distended, say for a day or two, the fear is that it will not readily contract again. In the case of an old man's bladder, thoroughly distended by long retention, it is very likely not to recover its powers. Although the patient has made water fairly up to the time of retention, if you leave him too long with opium, hot baths, and treatment of that kind, the bladder is getting bigger all the time, and you will very likely have more trouble with it afterwards than if you had relieved him with the instrument at once.

Again, if you have had a great deal of trouble in passing the catheter, I suppose you must leave the instrument in; but it is not good practice in these cases. Rather withdraw it, and use it again; because the prostate will be injured by an inlying catheter. Unlike stricture, which is often well treated by an inlying catheter, the prostate is always more or less irritated by it; but less harm accrues from a flexible than from a silver instrument. Better still if you can pass a vulcanized india-rubber catheter, which is the only one which lies harmlessly in the urethra in a case of prostatic enlargement. It may sometimes be insinuated by a series of short, quick pushes, thus [illustrating the method]; or, failing in that manner, by mounting it on a stylet of any curve which may be desired, and subsequently withdrawing the stylet. It is not difficult to keep it in its place if properly tied in, using the supra-pubic hair for the purpose, as you have so often seen; and the instrument has the merit of rarely becoming encrusted with phosphates, while its

flexibility enables the patient to move about his room. A short metal tube within the stem renders it more secure; some are made with "wings" at the vesical extremity in order to retain it in place, but these mostly irritate the urethra and increase the difficulty in passing it. In short, the vulcanized catheter is sometimes of great service.

Subsequently, as the canal recovers, should the bladder not regain its tone, and it is therefore necessary to use the catheter two or three times in the twenty-four hours, you will probably in the course of time teach the patient to relieve himself; and he will often, with a little tuition, succeed remarkably well. With respect to the frequency with which he should be advised to do this, it will depend mainly upon the amount of urine left in the bladder after a natural effort of micturition. The patient's own feelings will aid in answering the question; but if you find him, after having passed water, retaining say six ounces, a catheter passed every night and morning will probably be sufficient. The bladder must be emptied, or the urine will in time decompose, become irritating, and chronic cystitis will result. If a pint is left behind after making water, the bladder should be relieved, as a rule, three times a day. If the patient makes no water by his own effort, he should be relieved four or five times, or even more—certainly not less, as a rule, than three or four times in the twenty-four hours.

You often find (and this is a matter of considerable importance) that although up to the time of the attack, or of the necessity for the use of the catheter, the water has been perfectly clear, yet, after you begin to use the catheter habitually, the patient gets more or less cystitis, and is feverish and unwell. That stage has very often to be passed by those persons who suddenly change from a natural mode

of micturition to an artificial one. It requires some judgment to say when that change should be made; but as soon as you find it necessary to pass the catheter regularly, the patient will often show some change in his general condition; and you should be aware of this, and watch the results. Sir Benjamin Brodie was the first to point out, in his valuable lectures on the Urinary Organs, that sometimes patients gradually succumb to a low or feverish condition after beginning to use the instrument. The remedy, or rather the preventive method, is this:—Do not empty the bladder on each occasion of using the catheter at first. If the patient has been in the habit, perhaps, of retaining at least a pint of urine after he has made water, it is a great change for him to have the bladder quite empty two or three times a day; and it is thus that the organ becomes irritable, the urine charged with pus, and then he loses his appetite, becomes feverish, and is sometimes in danger of losing his life. The rule under such circumstances is to proceed cautiously. Instead of drawing off a pint, draw off half a pint; leave some behind, and so make a compromise between the condition of the bladder and the general condition of the patient. Draw off half or only two-thirds of a pint; you will thus relieve him a little, and so gradually, in the course of a month, you may accomplish the entire emptying of the bladder, and all will go on smoothly and well. Notwithstanding all your care, now and then you will find a case in which during this process the tongue grows slowly more red, dry, and contracted; the powers of life gradually fail; the senses become impaired, and the patient sinks. You will always find in such cases, by autopsy, old-standing pyelitis, with dilatation and injury to the renal structure, and you will know that in no circumstances could the patient have long survived.

LECTURE VI.

RETENTION OF URINE.

GENTLEMEN,—Retention of urine is the principal subject for to-day ; and if we at all realize what is the condition of a patient who suffers from retention, with the acute and constant pain which it involves, we shall feel how important it is to relieve him, not only as easily, but as early as possible. And there are very few cases in which you will meet with more gratitude if your treatment is skilful and prompt. For not merely are his physical sufferings extreme—and I suppose every man who has been so situated as to be unable to relieve a distended bladder, even for a short time, has had some glimpse, though only a faint one, of the distress occasioned by inability to pass water for several hours, or even days—not only, I say, is the pain intense, but there is extreme anxiety of mind also. He fears that the bladder may burst (a circumstance, however, of exceeding rarity), and he always looks forward with gloomy prospects to the consequence of not obtaining relief.

Now, while retention of urine is very common in the hospital, it is not so in private practice. The circumstances of exposure, the more hazardous callings which men have who form hospital patients, determine this difference ; therefore, when met with among the higher classes, it is always

a very grave matter, and in all circumstances, wherever encountered, will demand all your care and skill.

Then, again, if you are successful, the relief which you afford is instantaneous. It is not like the questionable result of a dose of medicine, which a sceptical patient may persist in attributing solely to our great ally—the curative power of nature. There can be no uncertainty as to the result of your treatment if, after twenty-four hours of agony, relief follows your dexterous use of the catheter, and the two or three pints which the patient was unable to void are withdrawn by your hand. He tells you that he is in "heaven"—a common expression with such patients—and he never will doubt for a moment that you were the author of his "translation."

Retention comes before us in three typical forms, each requiring a different species of treatment. There may be some instances which cannot be absolutely so classed, and some the characters of which belong equally to two forms; still, for convenience, it is well to adopt this classification. First of all, you may have retention occurring in a young and healthy man who has no stricture; next, it may occur in an older man who is the subject of confirmed organic stricture; and, lastly, it may occur in a man who is neither young nor hale, and who has no stricture, but has an enlarged prostate. Of the last I have nothing to say; we have already discussed that subject, and the mode of relieving retention in connection with hypertrophied prostate. But I shall ask your attention to the two other conditions—namely, retention from inflammatory swelling, and retention arising from organic stricture.

With regard to the first kind, you will probably learn a history something like the following:—within a month or

six weeks the patient, who is generally a young man, has had gonorrhœa. He has obtained considerable relief from treatment, and has in consequence allowed himself some relaxation of the regimen to which he has been lately submitting. Thus, perhaps, he has indulged a little in the use of alcoholic stimulants, has taken some unusual amount of exercise, a game of cricket or the like, and, after being over-heated, has been sitting on a cold stone or damp grass; or, lastly, he may have indulged in some strong emotional excitement. Under those circumstances, what is called "inflammatory stricture" may be produced. Now let me say, repeating myself slightly, that that condition has no right to the name of stricture. First of all, the inflammation is probably at the neck of the bladder or in the prostate. It is difficult to ascertain that, except by inference, confirmed, however, by a rectal examination; for, happily, we very rarely make post-mortems under such circumstances, as the patient does not succumb to the complaint. But what almost to a certainty takes place is a degree of inflammation and swelling of the prostate, not in the least resembling stricture—that is, it is not a circumscribed narrowing at a particular part of the passage, but a tumefaction of the prostate gland, which prevents the expulsive apparatus of the bladder acting and discharging its contents. That is usually the real condition in what is called inflammatory or spasmodic retention.

This condition of the prostate resembles that which affects the tonsils, and which we call inflammatory sore throat. Both complaints consist in the enlargement of glands which more or less surround narrow passages, and which thus interferes with the functions of those passages; both occur rapidly, and may be produced by external cold.

Now, what are the early signs of inflammatory retention? First, there is usually some cessation of the gonorrhœal discharge. Just as in the case of orchitis, where the urethral inflammation is supposed to subside and to attack one of the testes, the inflammation of the prostate is similarly associated with diminished discharge, and if you examine by the rectum, a tender and swollen condition of the prostate will be discovered. Then the stream of urine grows smaller and smaller, and in a very short time the patient loses altogether the power to relieve himself. He is feverish, very restless, and suffers severe pain about the lower part of the abdomen and in the perineum. Those who are the subjects of stricture may have become in some measure accustomed to the difficulty, but when an active young fellow is thus attacked for the first time, he is in a state of extreme distress.

Now, as to the treatment of such a case. The patient desires ardently to be relieved immediately, and declares he cannot endure his sufferings. You see him bent nearly double in order to relieve the pressure of the abdominal muscles on the bladder, and he is even breathing shortly and quickly to avoid their action there. The old treatment in such cases—the classical treatment of twenty years ago—was bleeding from the arm or perineum, repeated hot baths, and large doses of opium, so as to enable the patient to bear the pain and dispense with the catheter. The reason assigned was, that in an inflamed state of the canal, you might do more harm than good with a catheter, and that it was therefore better to mitigate pain by the means described. I have told you that I dissent from that treatment altogether, although it is still employed to some extent. For, first, you must look at the after-consequences; and if you allow a young man to remain thirty-six or forty-eight hours with an unre-

lieved bladder, because you fear to use an instrument, permanent mischief may be done. I have seen patients who for years have been unable to empty the bladder after treatment of this kind. Extreme and continued distension of that organ sometimes destroys or permanently diminishes its contractile power, and produces a condition which is properly termed "atony of the bladder." Therefore, if you pass the catheter, even at the risk of doing a little mischief to the urethra, I am disposed to think you would be wise in incurring that little risk rather than expose the patient to the other danger. But then it ought to be done without such risk. For my own part, I always take a moderate-sized flexible catheter—one not larger than No. 6 (English scale), as a large one gives in these circumstances unnecessary pain—which has been tolerably well curved in the way I have before described, since it has to enter over a swollen prostate. Or, you may use a French one with a bulbous end, or with the end "coudée." In this manner there is generally no difficulty in relieving the patient, who is exceedingly grateful for what you have done; whereas if you put him through the long process, and he relieves himself ultimately, he thanks you for little, comparatively speaking, and he runs the risk to which I have referred. But in the event of the flexible catheters not passing, you should try a silver catheter of the same size. I believe one of the first persons to denounce the old plan of bleeding and hot bathing was Mr. Guthrie. If you turn to the racy writings of that experienced and practical surgeon, you will find an anecdote in connection with this subject. He relates the account of a visit which he paid to a patient in the circumstances of retention I have described, and the reason, in strong and graphic language, why he then gave up for ever the bath and

bleeding practice, and passed the catheter at once for such cases in future.

So much for the inflammatory condition of the prostate producing obstruction to micturition. I need not refer at any length to spasmodic retention, which rarely happens. At the same time it may be as well to say that no doubt where an inflamed condition of the urethra exists, spasm of the muscles may co-exist; but the precise share which each takes in contributing to the result will not influence the treatment.

Now I come to the second form of retention—viz., that depending upon organic stricture. Here we generally have to do with an older man, because it is rare to find a young one suffering from confirmed organic stricture. As a rule, to which there are exceptions, such a patient mostly has stricture ten or twelve years before he gets complete retention. First of all you have to ascertain that it is stricture. You will probably find that he suffers less acutely than in the previous instance, but still a great deal; the progress of the case has been more gradual, and the derangement has not necessarily been brought on by any great or sudden imprudence. He has been passing water with difficulty for weeks or months, and at length some slight thing has produced a condition of absolute retention; the last ounce has broken the camel's back. Or it may not be absolute retention as before; there may be some dribbling, indeed the patient may have been relieving himself in that inefficient way for days, but the bladder is greatly distended, and to all intents and purposes it is a case of urgent retention. You find probably also that the patient is accustomed to instruments. Now, what you have to do is to take an instrument of middle size, and pass it down to the seat of obstruction, to see

where it is. You will probably find it four or five inches from the external meatus. You should then take the finest gum catheter and endeavour to insinuate it into the bladder, and if you are sufficiently fortunate to do that, you should tie it in at once, so that you may have no further trouble with it. But that is not a very difficult case of retention. Supposing you do not get the gum catheter in, I should then recommend a small silver one, either No. 1, or smaller, and use it in the manner I described to you in the lecture before last. Notwithstanding all your care and skill, and those, perhaps, of your friends whom you may have called in, the instrument is still not passed. There may have been false passages (they are easy to make), and there may be such difficulty that it is almost impossible for any one to pass a catheter after your failure. We then come to the question: what is to be done next? Well then, first, much may be effected for these cases by opium and hot baths. Suppose the water is dribbling off, and you shrink from the *dernier ressort*—that is, puncturing the bladder, or other operation to relieve the retention of the urine,—a safe middle course may still exist for some of these cases. The patient up to this time may have been exposed to cold; let him have the benefit of a warm bed and hot baths, with large doses of opium,—and you must be very liberal with opium if you use it at all,—so as materially to mitigate the involuntary straining, which he can no more help than he can help breathing, and which is utterly unsuccessful as regards the contents of the bladder, often making matters rather worse than better. The result may be that the water will dribble off more freely than before, and you may find, after two or three days, that it will come in a larger stream, and that then you can pass the instrument without much

difficulty. The patient may often be saved an operation thus, if there are grounds for declining to perform it. On the whole, however, I do not advise waiting very long; still it is better that the patient should be temporized with in that way than that he should be damaged by an unsafe hand, either with knife or catheter. Most men, indeed, are quite sufficiently confident in their powers to rely on instrumental methods when they find that a patient cannot make water. Still, if you are convinced that you are not doing any good with the catheter—still more that you are doing mischief—you can in most of these cases successfully employ opium or an inhalation of chloroform, with hot baths and fomentations, that is, as regards the immediate and urgent condition.

But we will assume that you have done all that you can do in this way, and that the question of relief by some other means must be met. The bladder is increasing in size, notwithstanding your treatment. You examine the supra-pubic region carefully, and find a tense and perhaps large tumour there, reaching to the umbilicus, or nearly so, more like a uterus than a bladder. In some old cases of stricture there is not necessarily large supra-pubic dulness, for the bladder is thickened and contracted. Introducing the finger into the rectum, you find there also a swelling, produced by the distended bladder, and you then seek to obtain the sensation of fluctuation. If, placing my hand above the pubes, I feel a distinct wave communicated to my other index finger in the bowel, I know that to be a point at which the trocar can be inserted with safety. Also, if I find a well-marked rounded tumour over the pubes which is dull on percussion, the bowel around it clear and distinct, I have reason to believe that an operation over the pubes would be successful.

Again, the question arises: why not attempt to relieve the bladder by an operation on the urethra itself from the perineum, so as, if possible, to cure the stricture, and at the same time relieve the bladder? Might it not be wise in this manner, as it were, to kill two birds with one stone, and not be content with merely puncturing the bladder by the rectum or above the pubes?

At this point let me revert to the different practice and different experience of surgeons in relation to this matter. Let me give you the experience of Mr. Liston. He once said, from his chair, that during the whole of his connection with the Royal Infirmary of Edinburgh, and subsequently with this hospital up to the time at which he spake—namely, three or four years before his death—he had never punctured a bladder for retention of urine. On the other hand, there are men living in this town who have punctured a bladder fifty times or more. Mr. Liston meant to imply that a good surgeon ought rarely to find it necessary to resort to any other means than the catheter in circumstances of retention. But do not suppose for a moment that the gentleman I spoke of who has punctured a bladder fifty times, does so because he fails to pass the catheter under those circumstances, but because he thinks it wiser to puncture the bladder than to persevere too much with the catheter. Then, again, both Liston and Guthrie occasionally performed the perineal operation just spoken of. From the perineum the urethra *may* be reached behind the stricture. Now, without entering into a long discussion on the subject, I may say that this mode has lost favour of late years. It is no easy thing to find the urethra behind the stricture; and a man may make an awkward wound in the perineum, and never hit the urethra at all. Then it does

not follow that it should be desirable to divide the obstruction at all, so far as its cure is concerned; for the stricture, when the time comes to treat it, may be amenable to dilatation. The reason why puncturing through the rectum has been done so often by Mr. Cock, of Guy's Hospital, is because he conceived it to be an excellent kind of treatment. He says: "Let us withdraw the urine from the urethra altogether for a few days, and the urethra will recover itself, so that we may be able to cure the stricture with ease." And that is often true. He punctures the bladder by the rectum under the circumstances I have mentioned; and this is his instrument for doing it. In this way, the water not passing by the urethra at all, the urethra is lying fallow, so to speak; and in a short time the instrument can be passed — say No. 2, or 3, or 4 catheter, although before you could not pass No. 1. This, then, is a species of treatment of stricture which Mr. Cock has introduced; and, at all events, he has proved how easily and safely this operation may be performed: he has, in fact, familiarized us with a proceeding which before was often thought a very grave and serious affair.

My own experience of puncture of the bladder for retention of urine, is, for prostatic enlargement twice, and for retention from stricture, four times: this is during a period of twenty years. One of the former was a supra-pubic puncture, all the others were by the rectum; on all other occasions I have succeeded by means of the catheter. I should add that two of the rectal punctures were on the same individual, once in 1859 and again in 1870, he particularly requesting me to operate on the latter occasion as I had done on the first, because the relief was so speedy and complete. Otherwise I have no doubt I should have succeeded with the

catheter. He is living now and in fair health. No doubt it is the simplest and safest operation in most cases when the bladder has to be opened. A very considerable enlargement of the prostate makes the supra-pubic operation necessary. In the one case in which I did it the prostate filled the pelvis: it was the largest I ever saw; the bladder had long been emptied only by a fourteen-inch catheter, and that with difficulty. I once punctured through the pubic symphysis—a method I shall not further allude to—and failed to find urine. I punctured immediately after by rectum and gave relief, the patient recovering. There is still a more recent method, which it is quite possible may sometimes be advantageous. I refer to the aspirator of Dr. Dieulafoy, which I have never thus employed, although I have, and with the best result, in removing the fluid of empyema. For the bladder you would use a very fine trocar above the pubes, and you would not hurt the peritoneum if you punctured it, for I have removed tympanitis in peritonitis with the same instrument, and having adapted the exhausting syringe to it, the urine might be safely removed. Of course it would be necessary to make a fresh puncture when the next relief was required, supposing that the bladder had not been able to act for itself by that time. Here is the instrument which you have seen me employ several times for the purpose of evacuating large chronic abscesses. The slight puncture required for such a slender trocar is not to be feared, and may be frequently repeated.

If, then, you have failed to pass the catheter, and the symptoms are urgent, you have the proceeding already named before you: puncturing by the rectum, or above the pubes (*see* Fig. 18). By carrying into the bowel your finger—a reasonably long finger—you arrive at a point just

behind the prostate. The other hand is placed above the pubes, that the wave of fluid, by its pressure, may be distinctly felt by the finger in the rectum. You are then quite certain of what you are going to do. Along this finger, kept firmly in place, your trocar is slipped, and then boldly, but carefully, pushed into the bladder. This is always an anxious moment, because, if you have not hit the bladder, it is a serious matter to have thrust this long instrument into the centre of the body, and to find no urine escaping. The best position for the patient is sitting on the edge of a bed, resting his back on pillows behind, the legs apart, each



FIG. 18.—A section of the pelvis showing bladder and rectum.

on a chair; an assistant by him placing one hand on either side above the pubes, so as to steady the bladder, and press

it down towards the rectum. It is well to remember, subsequently, that if the canula slips out you will not be able to get it into the same opening again. The muscular fibre of the bladder instantly closes, and you have to make another puncture—not a matter of much consequence, but better avoided.

For the supra-pubic operation you divide the structures in the middle line until you reach the linea alba. Then carefully making your way deeper, you will soon discover fluctuation; and, having the bladder steadied as before, you will thrust the trocar slightly downwards. In this case you retain the silver canula for two or three days; but you may soon substitute a gum instrument. Now, supposing there is a probability that your patient may require this artificial relief by tube for some time, you will, of course, prefer the situation above the pubes, because it is much more easy to wear the tube there than it is in the rectum, where it interferes with the functions of the bowel, and is otherwise much in the way. I have known patients who have passed all the urine through a tube above the pubes from ten to fifteen years, and who lead active and comfortable lives in consequence, the natural passage being completely obstructed. One of them, who had suffered greatly before, and was now in perfect comfort, told me that "he did not know whether this mode of passing water was not preferable to the original one!" That, however, I conceive, is quite a matter of taste.

Our next subject will be Extravasation and Fistulæ.

LECTURE VII.

EXTRAVASATION OF URINE AND URINARY FISTULÆ.

BEFORE commencing the subject of urinary fistulæ, I shall briefly allude to a condition closely related to retention, just considered—viz., extravasation of urine. And it is related in this way :—Suppose that from bad treatment, neglect, or otherwise, the patient has had no relief, and when you are called in you find there is no question of puncturing the bladder, for the urethra has punctured itself, so to speak: that is, Nature (as in the case of all maladies) has done something towards a cure; but she often acts in a clumsy way, although sometimes not more clumsily than the surgeon. There is no question that many who are the subjects of stricture or retention, and receive no surgical aid at all, will lose their lives in consequence: but they are sometimes saved by extravasation of urine taking place. What then happens is, that a portion of the urethra gives way behind the stricture, perhaps during some violent act of straining, and through the rent so made, a quantity of urine is driven with great force into the cellular interspaces. Well, we know where that must go, from the anatomical disposition of the fascia—viz., into the scrotum, up into the groin above Poupart's ligament, and rising upwards over the

belly. Occurring, as it usually does, in the bulbous part of the urethra, where the walls of the canal are weak, the urine cannot pass backwards behind the scrotum, or the back part of the perineum; neither can it get into the thighs, because it is checked by Poupart's ligament. I have seen it rise as high as the chest, and I have made incisions to evacuate it, in a bad case of extravasation, as high as this point. Once taken place, it follows that at every action of the bladder more fluid is driven in with force, so that the cellular inter-spaces are separated, and the fluid gradually finds its way upwards. Generally, you ought to know at once, by the appearance of the patient, what has taken place, although it is possible sometimes to confound the condition I speak of with ordinary inflammatory oedema of the scrotum, for it may commence very gradually and insidiously. In ordinary cases, you see a hard perineum, a large red tense scrotum, the penis swollen, and a red blush perhaps rising over the pubes. In order to ascertain the true state of things, you must ask for the antecedents, and you will probably learn that there was great difficulty in passing urine, followed by rather sudden relief. When a man has had retention for some days, and extravasation suddenly takes place, instant relief is experienced—the frightful want to make water disappears as soon as the fluid finds its way into the scrotum; but he soon feels new pains, not necessarily very severe, and what is worse, constitutional symptoms rapidly set in. The poisonous fluid quickly destroys the cellular tissue, so that sloughing soon begins. After forty-eight hours or so, gangrenous discolorations appear, and the urine may find its way into the corpus cavernosum, when a dark spot appears on the glans, showing that the structure of the penis itself is infiltrated. Without describing further this

condition, which you must have seen for yourselves, and which may be seen now to some extent in a patient in the ward upstairs, let me say, do not in such a case be afraid of the knife. You have no occasion for a catheter; the urine has found its way into the cellular tissue, and you must let it out as freely as possible. On each side of the perineum make a deep incision. You need not limit the incision to two or even three inches; because you are really cutting into urine, not into flesh. The structure is so enormously distended, that there is but little flesh to divide; and although the incision may appear very deep and long, when the water has run out, it will be comparatively small. The incisions generally bleed rather freely. One may soon lose a pint of blood from three or four incisions. The urine runs out also, and as the distension goes off, the vessels are enabled to contract better; but if you see any little vessel spouting, tie it at once. An incision should be made on each side of the penis, because if it is made in the middle line, there is not sufficient communication for the incisions on the one side to relieve the other. Do not be extravagant in these incisions; still it is better to err on the side of freedom than to be too niggardly in the use of the knife. The next day, if the case has done well, you will find the scrotum much reduced in size, and the parts altogether much less swollen and inflamed. You have now a direct communication through the cellular tissue from the bladder, and, with that rent behind the stricture, as a rule, you will be safer in letting the catheter alone, and permitting the water to drain off. What happens? Why, just what happens after puncturing the bladder. When the water flows off by another passage, the urethra begins to improve, and in three or four days you will probably have no

difficulty in passing No. 3 or 4 catheter. With these patients, bad as they are, prostrated as they are when you see them, if the case has not gone too far, and too much gangrene has not taken place, very striking and rapid recoveries often follow. The whole scrotum may slough away, and the testicles may be seen uncovered in the wound, and yet all may heal up soundly and well.

This leads us to the next subject. After the exit of the urine by these artificial channels, some of them fail to heal and remain patent, and thus form what we term urinary fistulæ. Now this day week there were in my ward three cases illustrating this condition, and rather exceptionally obstinate ones. One was caused by extravasation of urine, and the other two by the more usual and common cause—stricture of the urethra.

We have spoken of extravasation ; how does stricture give rise to a fistula ? Thus : in some patients, when a stricture has existed some time, and has had no treatment, or bad treatment, it is not uncommon for chronic abscess to form, say in the perineum, between the urethra and the surface. In time this opens externally, and a few days afterwards a little urine finds its way through it, and passes at each time of making water. If no relief is afforded to the patient, another forms ; and so several sinuses may arise, and other openings in various and surrounding parts, all giving exit to the urine. These fistulæ may take place in a great number of situations, such as in the penis, in the scrotum, in the perineum, in the groin, and in the rectum ; but the last are very rare. We will consider the first four by themselves, because fistulæ which open into the rectum require a different treatment altogether. Then, respecting their specific characters, I shall make three classes, examples of which may

be found in any of the localities named. First, fistulæ may consist of simple openings or channels between the urethra and the external surface; or, secondly, they may be surrounded with inflammatory induration, which makes them more difficult to heal; and, lastly, they may be complicated with loss of substance from sloughing, so that even a portion of the urethra itself may have been destroyed; and these are the most difficult cases to deal with. Hence these fistulæ classify themselves naturally as simple, indurated, and fistulæ with loss of substance.

I will deal briefly with the "simple urinary fistula." Whatever part of the canal it is connected with, it almost always heals, if the stricture with which it is associated is dilated. Dilate the stricture, and in nine cases out of ten the fistula will heal. Patients, especially in private practice, are often extremely anxious about the result of an opening in the perineum or elsewhere through which the urine passes; and it is right that you should assure them for the most part, if the stricture is thoroughly dilated, the unnatural passage will heal of itself. But there is another point to be considered in connection with this—viz., the quantity of urine passed by the fistula, compared with the quantity passed by the natural passage. Of course the gravity of the thing depends very much on the relative proportions passed by the two ways. Usually about three-fourths of the water will pass by the right way, and one-fourth or one-fifth by the wrong passage. If a large quantity—say three-fourths—passes by the unnatural opening, then probably a considerable amount of stricture is present. Nevertheless, as the stricture is dilated, you will see that the proportion of urine passing through the fistula will gradually decrease until it ceases altogether, and the part soundly heals; but

this latter result is achieved only on the condition that the stricture is thoroughly dilated.

Now we come to fistulæ which are associated with much inflammation and induration in the perineum. These may be multiple; in which case you may find five or six openings. I have known a man with a dozen, so that instead of the urine being discharged by one stream, it flows as from a watering-pot. Even this condition, however, very much improves as the stricture is dilated, and may get quite well; but this is not always the case. Then there are some instances looking much less formidable, like those upstairs, with perhaps only two or three openings, through which the greater part of the water has passed for a long while. You recollect that we fully dilated the stricture in each case; but still no improvement as regards the flow of urine through the fistulæ took place. A No. 12 catheter was passed; but the patients did not get well. The condition of the perineum improved very much; but still more than one-half the urine obstinately held its erratic course through the perineal openings. Now, what is commonly done in such circumstances? Usually operative proceedings of some kind are resorted to; or, if these have been postponed or rejected, a rather tedious process has been employed. The principle laid down—and I have myself applied it successfully—is, that it is necessary to take care that the external openings should be very free, ensuring this either by means of the knife, or by potassa fusa, or by some other means; so that the urine may not be detained in its way from the urethra to the external surface, causing fresh induration or thickening. Next, you may go on to excite adhesive inflammation in the track of the fistula by a hot wire, or by touching it with cantharides or a strong solution of nitrate of silver. No doubt this treatment some-

times succeeds; but it is at best a tedious process. Then it was sometimes attempted to cure such fistulae by tying in a gum catheter for weeks, or even for months. But this generally fails; and for this reason: that urine always finds its way from the bladder by the side of the catheter, along the urethra, and so into the fistulae by the force of capillary attraction; and thus the object supposed to be attainable never was and never could be so accomplished. The practical surgeon soon discovers that tying in an instrument never ensures the transit of the urine through it; some will always pass by the side and defeat your purpose. I have, therefore, adopted the plan of teaching the patient to pass the catheter himself; and that is by far the most rapid and the most certain method. With regard to the two cases upstairs, ten or fifteen years ago I should have applied potassa fusa or the galvanic cautery, or something of that kind; but the fistulae have soundly healed, through ensuring, by means of the catheter, not, as by the other process, that the urine should percolate rapidly through the perineum, but that it should not pass through at all—in fact, turning the current another way. You first teach the man to pass a No. 7 or 8 gum catheter himself—an easy matter enough. He then agrees to pass it every time he requires micturition, night and day. On no occasion is he to permit the urine to flow spontaneously—say during five or six weeks—not even when he goes to stool: and this is avoided by always using the catheter immediately before. That plan has been followed in each one of the three cases in question, without difficulty and with perfect success; for each man has a sound perineum, and has now relinquished the use of the instrument.

Now I come to the third form of fistula, that in which

there is loss of substance. This class must be dismissed rather briefly, because its full consideration would involve a tedious detail of many different surgical procedures. Where you have this loss of substance, a plastic operation of some kind is generally required, to fill up the gap which exists. When the opening is small, you may contract it very materially by the heated wire or galvanic cautery, or by any mode which tends to produce a contraction of the tissues. You know that cicatrices which result from burns contract considerably, and you avail yourself of that action in this instance. Most commonly, however, if the soft parts have been largely destroyed, some plastic operation is required for the cure. Thus, on passing a silver catheter, when a portion of the urethra has sloughed away, you may see perhaps a quarter, or a third, or even half of an inch of the catheter exposed in the wound. The successful treatment of such cases demands much care and nice management. They do not often come under our notice, and less often do they get completely cured. I have had in the hospital but three or four such cases, in which, by means of plastic operations, the patients have been entirely cured. Some of you saw one last winter—a man who had just between the angle of the penis and the scrotum an opening, showing at least a third of an inch of the catheter, the whole of the floor of the urethra having sloughed away. The operation in that case was one of the most successful I ever saw. The first operation completed it, with the exception of an opening not larger than a pin-hole. What was done was to pare the edges all round, then to get a flap of skin from the scrotum below, which was brought up to cover in completely the wound, the margins being carefully attached by a number of little sutures. That fistula healed perfectly. And why

did it heal? Here is the important point: there was one condition necessary, without which it would have failed. A week or two before this operation, I made the patient learn to pass the catheter habitually, so as to draw off every drop of urine; and finding him thoroughly expert at it, I performed the operation; and for a month he never allowed a single drop of water to pass otherwise than by the catheter. Had I tied the catheter in, it would not have been sufficient, because the water, as I have told you, always finds its way by the side sooner or later. Luckily, he performed his part of the compact to the letter for the stated term, so there was no reason why the wound should not heal there as well as anywhere else. The little tiny opening which remained was perfectly closed with the heated wire, and the urethra can now perform all its functions perfectly well. You know there is another very important function connected with this canal, besides that of micturition. I do not know what you may think that function worth, but it is one which may involve very important considerations in cases where the transmission of a great family name or title or estates depends on it. Whether this be so or no, there is no doubt that every man conceives that to be an important function for himself, whatever others think of it for him; and it could not in this case have been performed unless that opening had been closed.

Now, in order to go into the whole subject, I should want a lecture or two to tell you of the different kinds of operations which are performed in different spots. I have taken the case described as a typical one. It is one of the most difficult to close. The penis is liable to differences in form: the patient may be troubled with erections, which may damage any operation, and there is very little flesh to deal

with. In the perineum you have two or three inches of depth, so that you can cut flaps of any size and thickness.

A word or two about the rectum. You remember that I made an exception in reference to fistula coming from the urethra into the rectum. There is a case upstairs in which it occurred from the patient himself thrusting a bougie from his urethra into the rectum. More commonly it occurs from prostatic abscess. In these cases, at each act of micturition, urine passes into the rectum—often a very troublesome, even distressing circumstance. The rectum becomes excoriated, and the patient is obliged very frequently to go to stool. I shall say very few words about it, because each case must be treated on its own merits. I will give you the result of my own experience, and that is all I can do. I do not know that there are any published records respecting these cases. They are very few in number, but they are very important when they do occur. I cured one case by position. It was the case of a young officer whom I saw in private practice (I have not met with a precisely similar one in the hospital, and therefore refer to it), who passed three or four tablespoonfuls of urine into the bowels at each act of micturition, after having had some abscesses there which I did not see. It occurred to me, after some wholly inadequate treatment by other means, to tell him to lie down on his face and make water in that position, never allowing a drop of urine to pass in any other way. In a few weeks he was quite cured—very luckily for him, and for me too. If you ever meet with such a case, the plan is worth trying. I have had two other such cases since, but the plan has not succeeded. In the instance to which I refer, it occurred to me that the force of gravity would carry all the proper way, and it did so. None passed into the rectum, and at the end of six weeks the

patient was well. I saw him some years afterwards, and he was soundly cured. I take it that I should now have made that man pass the catheter into his bladder and draw off every drop of water: and I have no doubt it would have been successful. Unless there is a loss of substance, that usually does cure the patient; but if there is a loss of substance, and worse still, if the opening is from the bladder into the rectum direct, then nothing is left but to examine the place thoroughly in the first instance. Put the patient on his back, as for lithotomy, and introduce a duck-bill vaginal speculum, as you have seen me do, so as to get a good light thrown upon it. If it is sufficiently large to do a plastic operation, I should not hesitate to perform the same operation that is done for openings between the bladder and vagina—that is, to pare the edges, and stitch them together with silver sutures,—only it is more difficult, as there is less room in the rectum for manipulating than in the vagina. In the vagina there is plenty of space for the work, but I have done it also in the male in one case. I found it possible to do, though difficult; and I believe that is the best plan when these cases occur with loss of substance. If the opening, however, is very small, it may be greatly diminished in size, if not closed, by applications of the galvanic cautery.

Such a condition sometimes happens after the operation of lithotomy. A lad was here not long ago—many of you remember him—who had been cut in the country some years before with success, except that the rectum had been opened; a fistula had existed ever since, and he was sent up for me to close it if possible. I placed him in the lithotomy position, under chloroform; emptied the bladder by a catheter; and with the vaginal speculum above mentioned

we could all see an opening in the upper and left part of the bowel which admitted a number nine silver catheter. Having ready prepared a large double wire connected with a powerful battery, the wire was first shaped and placed within the fistulous canal, and then, the current being turned on, the sides were freely touched with the heated wire. This proceeding was repeated about once a week or ten days, the quantity of urine passed by rectum rapidly diminishing. I never, however, could altogether close the track, although I reduced the rectal urine to a trifle, and so made the patient quite comfortable. He no longer wetted the bed against his will at night, which forms one of the most troublesome features in these unfortunate cases.

LECTURE VIII.

STONE IN THE BLADDER.

GENTLEMEN,—I wish to give you to-day a sketch in outline, embracing all the principal points, if I can, of a very large and important subject—viz. stone in the bladder of the adult male. I shall say little about stone in children, and nothing, at the present time, about stone in women.

First of all, in what classes of cases is stone most common? Contrary to what is stated in books on the subject, it is most common in individuals from fifty to seventy. In books you will find it stated to be most common in children. Perhaps it is so if you take the number of cases in children as compared with the number of cases in elderly adults, although this is by no means certain, but not if you take the individuals of either class relatively to the numbers of that class living at the time.

I think it may be said that the most favourite period for calculus is from about fifty-five to seventy-five; the next in order is that below puberty, and the most rare period is that of middle age. Looking at the cases numerically, you may put it down as a general rule that half the total number of hospital cases occur below thirteen years of age. I cannot refer you to any more exact researches than those which

were made with great labour some years ago by myself. Out of 1,827 such cases, each one of which was reported to me in writing, and of which I knew all the principal particulars, one-half occurred before the age of thirteen. You will remember that this is in hospital practice, which gives a very different set of cases from those seen in private. For example, the operation for stone is excessively rare among children of the middle and upper classes. I don't know any disease which marks more distinctly, nor more curiously, its relations with class than this. So common is stone in the children of the poor, comparatively speaking, that at Guy's Hospital, surrounded as it is by a very large neighbourhood, densely populated by the worst-nourished classes of the community, quite one-half the cases admitted are children. Among the same classes, however, it is very rare at the other end of life; very few elderly working men in London being afflicted with it. On the other hand, among the well-to-do and well-fed, although almost rarely found in childhood, it is almost common at advanced age. This has been very much overlooked, and its frequency then is greater than most people believe.

Now, with regard to the varieties of stone, I do not give you here all the chemical distinctions; that is not necessary; but I will mention three chief classes which it is important to consider in relation to the practical management and the removal of stone. That which is most frequently met with is formed of uric acid and its combinations; the second is that in which phosphoric acid is combined with volatile alkali and the alkaline earths; and, lastly, there is oxalate of lime. For all practical purposes those are the three great divisions. Among these, uric acid and the urates form about three-fifths in number, the rest being phosphates, with

the exception of about three or four per cent. of oxalate-of-lime calculus. It is necessary only to remember that very rarely a calculus may be formed of pure phosphate of lime or of cystine. It has fallen to my lot to operate on one case of each in my life.

Next, what is the ordinary history of stone? You know well, of course, that the appearance of a stone of some size in the bladder is not the first stage of the malady. The stone begins always—I am now speaking of uric acid—as fine sand or gravel, to use popular terms: that is to say, there is an excess of urates, which, perhaps, steadily persist; then, possibly, of uric acid, in characteristic cayenne-pepper-like masses of crystals; then there are small rounded bodies of this latter aggregated within the kidney, about the size of shot, or somewhat larger, of which you have very good specimens here. An acid calculus, then, is always formed within the kidney; and it is a fortunate thing if it descends into the bladder, because sometimes it is retained in the kidney, and, as renal calculus, becomes the source of great misery, for which surgery can do little, although medicine may be of some small service. But if it comes down into the bladder, it is usually passed—say in nine cases out of ten—without any operation whatever. The patient has an attack of severe pain in the back, over the hip, in the groin and testicle, lasting for some hours, and it probably ends in the descent of the calculus from the kidney to the bladder. When it gets there, after a day or two, or before, it is generally expelled by the urine, and there is an end of the matter; only the patient must be told, or ought to know, that this occurrence shows a strong proclivity towards the formation of stone, and he should immediately do all he can to prevent its continuing, as in the nature of things it will

do. But if the bladder is unable to expel the calculus, it soon increases in size by deposit on its surface of acid from the urine, and a very hard but rather brittle stone is formed in the course of time. All the stones which you see in this box have been passed through the urethra by the natural efforts; and it is worth knowing how large a stone may be so passed in some cases. Usually, when they get as large as some of these, they fail to pass, and then some operation must be performed for their removal.

The phosphatic calculus is not necessarily formed in the kidney; it is so sometimes, but usually it is formed in the bladder. In the mucus of a diseased bladder a good deal of phosphate of lime is formed, and this, meeting with ammonia from the decomposed urine, produces the ammoniacomagnesian phosphate. This, with the phosphate of lime, makes "fusible calculus," the commonest form met with. Its structure is not dense, and it is easily crushed. The oxalate of lime, or mulberry calculus, I need not tell you, is not originally formed in the bladder, but in the kidney, and it is the hardest in structure and the roughest in external surface of all.

Now, what are the symptoms of stone? These we will seek, if you please, by means of the four questions always to be used. A patient tells you, perhaps, that he has passed some gravel for a year or two, and may show you some small stones which he has passed. For the last few months, perhaps he has not seen any; but, during that period, has had increasing difficulty in passing his water, a circumstance which will strongly excite your suspicion. First, as to frequency of micturition. The patient has for some time had more or less frequency, but it is increased during the day when moving about, and decreased at night, when he is at

rest. This is contrary to what usually takes place in prostatic enlargement, and hence it is a good diagnostic point.

You next ask for pain. The patient with calculus of the bladder has almost always pain at one particular spot, the lower part of the glans penis, about an inch or less from the external meatus. Remember, you may have some pain there when there is no stone in the bladder, as in chronic prostatitis and in some affections of the bladder; but in stone it is almost always present, and is usually severe. Further, with regard to pain, the question should be asked, whether the patient feels it before, during, or after making water. He will tell you that it is during and after; whereas you know, in hypertrophied prostate, and in all cases in which water is retained, the pain is before passing water, and it is relieved by the act. A man with stone feels pain after making water, because the foreign body is then left in contact with the lining of the bladder, and being driven to its neck, severe pain and a strong desire to micturate are felt, perhaps for four or five minutes, until fresh urine entering, the coats of the bladder are separated from the stone.

Then you ask him the condition of the urine. In nine cases out of ten you find that there is muco-pus, and also, perhaps, streaks of blood. There is almost always, but not invariably, more or less clouded or muco-purulent urine with calculus.

Then, lastly, you ask him with regard to blood. Almost without exception blood has been passed at some time, and it is increased by movement. A patient with calculus suffers more pain, and has more bleeding, and the urine becomes more thick, if he takes much exercise. He cannot ride on horseback nor in a jolting vehicle without considerable pain; in fact, all quick movements of the body intensify the

symptoms. Certainly a patient presenting such conditions ought always to be sounded.

Then, how do you sound? You should employ an instrument like this, with a small short curved beak, because it can be turned in any direction. If you take an instrument with a large curve, like a catheter, you are unable to rotate it in the bladder, and hence it cannot explore sufficiently.

When I entered this room, you heard me ask for the hospital sounds, for I knew I should find among them a good example of what a sound ought *not* to be. Here is one, for example, which no one could rotate, or ever find a small stone behind an enlarged prostate with, except by sheer accident. It has precisely the form of a common catheter. You will say, naturally enough, "Why are such sounds here, and who has used them?" They were used formerly, and found a good many stones, too, in the hands of our illustrious predecessors. But I will answer for it, they have missed a good many stones, also; and this is precisely what I want you not to do. I have no hesitation whatever in

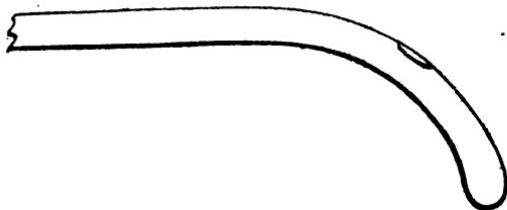


FIG. 19.

saying that more stones are missed in sounding than are found by the ordinary methods adopted in this country; and that must be the case if a sound of the form of the

common catheter is relied on for the purpose. But with an instrument which has this small beak at the end of it, you can search in every direction (*see* Fig. 19). If there is a large stone, of course you can find it with anything; but our great object is to find the small stones. As a rule, anybody can find a big stone; the art consists in finding a small one. It is most important to find a small stone, because it will grow large, and may be very formidable to deal with; whereas, when it is small, it is a far less formidable matter. You may promise the patient, in the case of a small stone, that it may be removed without risking his life; whereas in the case of a large stone there is always some risk, often considerable danger.

In the next place, how are you to use this instrument?

First of all, it is not to be introduced in the same way as the ordinary catheter. With the ordinary catheter you stand at the left side of the patient, and make a gentle sweep thus into the bladder. With the sound you stand at the right side, and use a different manipulation, which I shall show you on the living patient, at my next lecture, postponing, therefore, my remarks on the subject until then.

But you have something else to do besides merely discovering the presence of stone. It is necessary to have other particulars respecting it, because the nature of the operation to be performed will depend on them. First of all, it is essential to know what the size of the stone is before you decide on what you will do with it. From the note elicited by merely striking it, you can get some indication of its size. It is often sufficient for practical purposes to use a sound (which I have long used myself, and have recently introduced) provided with a little slide on the shaft, which, by proper manipulation, enables you to ascertain very nearly



FIG. 20.—A sound with slide and scale, for ascertaining the magnitude of a stone. The handle, which resembles that of my lithotrite, but smaller, affords great facility in sounding.

the size of a stone, as you have frequently seen in the wards.

Then there is another way. You may introduce a lithotrite (which gives, however, a little more disturbance to the patient) and seize the stone in two or three directions, so as to ascertain its diameters.

At the same time you ascertain its nature. A phosphatic stone gives a very different sound from the others. The specimen before me is dry, and, therefore, will not give the sound to which I refer. When wet, it is spongy and soft, with a rough surface, and always gives a dull note when struck; whereas the uric-acid stone gives a hard ring. Then you will judge partly by the condition of the urine. If the urine is acid, and if, also, uric acid is thrown down, you may conclude that the patient has a uric-acid stone. If so, it is likely he has passed small calculi before. If the urine is very alkaline, and there is a great deal of phosphatic matter, you may conclude that it is a phosphatic stone, or, at all events, it is covered with phosphates.

The number of stones is the next thing. Usually there is only one stone, but occasionally there are more. There is a patient here on whom I shall perform lithotomy to-morrow, who has two rather large uric-acid stones in the bladder. The

way to determine that point is this: Having seized one

in the lithotrite, you move it gently in every direction as a sound for others. If then you encounter one on one side and one on the other, you know that there must be at least three stones. There is a source of deception here which it is necessary to guard you against. While retaining the stone between the blades of the lithotrite, and moving the instrument from side to side in search for another, a rattling sound is easily produced which resembles very closely that of contact with another stone. This arises because it is not closely fixed between the blades of the lithotrite, and it rattles between them. I have seen the error committed of inferring a second stone from this cause.

I have spoken of uric-acid and of phosphatic calculi. But it may happen that you have an oxalate-of-lime stone—a very important thing to ascertain. You examine the urine, and see if there is much oxalate of lime thrown down. The patient may have passed a small mass of oxalate of lime before, and you may infer that an oxalate-of-lime calculus exists now; but then it may be covered up with phosphates, and so deceive you. I will give you a case in point. I had to deal with a very large stone in the bladder of a private patient. I crushed the stone four times, bringing away large quantities of phosphatic material. I always noticed that my lithotrite never went through the stone: it always went a certain way, and then there was a hard mass. After four sittings I could not crush any more. It was clear that there was a very hard centre stone, from which I had taken away a large crust of phosphates. My strongest lithotrite made no impression upon the stone. I know, from experience, the recoil of the lithotrite from an oxalate-of-lime stone so well, that I had no hesitation in saying this was an example of that kind. Accordingly I cut him, and a large oxalate-of-

lime stone was removed. In a case like that, you would not have oxalate of lime in the urine, but phosphates. In the case of a uric-acid stone, you may make an impression upon it with the lithotrite—its teeth will bite into it; but in the case of a large oxalate-of-lime stone, it is like laying hold of a piece of iron—you make no impression whatever upon it.

Having got all these data, the next important question is, what are you to do? Are you to cut or to crush? You know there are only two modes of removing the stone. You must either make an opening sufficiently large to admit of its withdrawal, or you must crush the stone into very small fragments, so that they may be expelled by the natural passage. It was less important to make a diagnosis of all these points, when we had but one operation—namely, that of cutting. Formerly, whether the stone was large or small, the patient was always cut. There was no other way of removing it. Now that we have two operations, it is very important that we should choose the right one; because, let me tell you, if you do not determine pretty accurately the characters of the stone, and select the right operation, you may do more harm than if you cut every patient. If you crush the very large stone, and cut for the very small one, you will have greater mortality than if you simply resorted to the one operation of cutting in all cases. When lithotomy was first introduced, it was rather a clumsy operation; and when the cases were not judiciously selected, when surgeons crushed without making a diagnosis of all these points—crushed stones that ought really to have been cut, and left for cutting stones which might have been crushed—the entire mortality resulting from operations for stone was greater than previously, when every case was cut. I cannot

give you a stronger argument for the necessity of apportioning the operations judiciously.

Now, without taking up your time too much, I will lay down what you will understand to be the axioms which should direct you, in a general way, in making your selection. First of all, I will say that all patients with stone, under puberty, with very few exceptions, are to be cut. Under fourteen or fifteen years of age, stones occurring in the male are to be removed by cutting unless they are very small, and can be crushed, say, in one operation; because lithotripsy is not a very easy or successful operation in children, the urethra being small and the bladder very irritable; whereas, as is well known, lithotomy is a very successful operation in these cases. We do not want a better operation, comparatively speaking, and may be content to let well alone. Not more than one death in fifteen or sixteen cases occurs from lithotomy in children. I do not think, therefore, we can do better than cut in these cases, as a rule. If, however, you have in a child of, say three or four years old or upwards, a stone no bigger than an orange-pip, you may very probably succeed in crushing it, under chloroform, in one, or at most two sittings; and this it is usually advisable to do.

That leaves us all the cases above puberty. Then I will say, in general terms, that all the cases above puberty are to be crushed, with certain rare exceptions. The first exception is in a case of an oxalate-of-lime calculus, which is, let us say, an inch in diameter. Under an inch in diameter you may crush an oxalate-of-lime calculus. I have crushed four or five in my time. The cases are very rare. Two of them were in this hospital. An oxalate-of-lime stone, from the size of a bean up to an inch in diameter, can usually be

crushed ; above that size no instrument can deal with it, and the fragments will be so hard that the operation might be of doubtful value, even if we succeeded in crushing. That, then, is the first exception to the general law that all cases in adults are to be crushed.

Secondly, a large stone of uric acid, or a phosphatic stone of very large size, had generally better be cut than crushed. Mechanically speaking, it is possible to crush any stone, whether uric acid or phosphatic ; but, considering the number of sittings required, and the amount of irritation produced, the single operation of cutting will be the better of the two when the stone is—shall I say—full two inches in diameter. A stone which is two inches in diameter, either phosphatic or uric acid, had perhaps better be cut. No doubt a rather larger phosphatic stone may be crushed. Here is a very large one, two ounces and a half in weight. The phosphatic stone is very friable, and you may deal with rather larger phosphatic stones than uric-acid stones by lithotripsy. So much for the exceptions to cutting, regarding the characters of the *stone* itself.

Now what are the conditions on the part of the *organs* which will make it necessary for you to cut instead of crush ? If you have a bad stricture of the urethra you cannot crush ; if you have a very highly diseased condition of the bladder, probably you cannot crush ; but such exceptions are very few indeed. First of all, I will tell you what are not exceptions, but which are stated to be so in books, and are generally considered as exceptions ; because lithotripsy has advanced since the time of most books. I have recently crushed a uric-acid stone in a case of organic stricture with small instruments made for the purpose ; but the stricture was not a very narrow one. And more recently I have

crushed stone in two cases in the wards, where confirmed stricture has existed, by the following method: I tied in a catheter for a few days, and dilated the stricture thus to number 10; then placed the patient under chloroform and introduced a small lithotrite, removing as much as possible. I then re-introduced the catheter, and let it remain there for three or four days, until he was ready for another sitting, and so on until all was removed. This plan answered well for two men who were not in condition for so formidable an operation as lithotomy, and whose calculi were not large. Hypertrophy of the prostate was said to be an exception: it was said that you could not crush under those circumstances. I make no difference whatever in respect of that matter; I would almost as soon crush in the case of hypertrophied prostate as in any other. It is mainly a question of delicate manipulation. If the hypertrophied prostate occurs in a man who has had instruments passed, he will have become habituated to them, and is therefore a better subject than a healthy one who has not been so accustomed. Next, it was said that when the bladder could not empty its contents by its own power, and the urine had to be drawn off by means of a catheter, lithotrity was contraindicated, inasmuch as the fragments could not be passed. On the contrary, I do not dislike such a case, for the reason just assigned—that is, the bladder and the urethra are habituated to instruments; and as to not removing the fragments, there is no difficulty at all in removing the very last fragment, thanks to the improved methods now employed. It was said also that great irritability of the bladder was a reason why we could not crush. It was said that if the bladder could not hold above three, or four, or five ounces of urine, there would be no room

for the lithotrite to work, and therefore the surgeon must cut. I make no objection on that ground, because the irritation of the bladder is due to the presence of stone; and as soon as you begin to get away the stone, the irritation often diminishes. Besides, it is not necessary to have four ounces of water in the bladder: one ounce is ample. There is no occasion to have four or five ounces in order to perform the operation of lithotripsy. It might have been so with the old clumsy instrument, but with modern instruments there is not this necessity to protect the bladder from contact with them. When instruments were used that were apt to catch the coats of the bladder, it was no doubt desirable to have a quantity of water in the bladder: but with modern instruments, which will not lay hold of the coats of the bladder, there is no difficulty whatever in crushing with a single ounce of water. I do not care whether the bladder is empty or contains a large quantity of water, provided only that it is not too full. Nothing is worse than too much water, because the stone rolls about, and you must, figuratively speaking, play a game of hide-and-seek to catch it. It is better to have an empty bladder than a bladder with half a pint of water in it.

You see, then, that the exceptions are very few; indeed there are very few adult cases which cannot be crushed, provided you give proper care and attention. If surgeons of the present generation now growing progress, as they must, and become more intelligent and more careful than those who have gone before—if they are better acquainted with the subject, as in the nature of things they must be, as our sons will be wiser than ourselves, and our grandsons wiser than they, there will be fewer and fewer exceptions; because, if the stone is discovered when sufficiently small, *it can always*

be crushed with an almost CERTAIN CHANCE of success; so that lithotomy for adults must at some day disappear, except for cases which have been neglected by the patients themselves, or have been overlooked by the medical attendant.

A rather large uric-acid stone is the growth of several years; a large phosphatic stone is perhaps the growth of two or three years; an oxalate-of-lime of full size, say from seven to ten years; and it is very hard if, long before the expiration of such periods, the stone cannot be found and disposed of by lithotripsy. It is certain that if there be proper intelligence and proper supervision of the patient, a stone would be always discovered, when it can be crushed with almost a certainty of success; so that the only cases in which lithotomy will have to be performed will be those in which the patient has neglected himself, and, although suffering from severe pain for years, has never gone to any surgeon to tell him about it. But those cases must be very few indeed. I hope you will live to see the day when lithotomy for adults will disappear. I do not suppose I shall; but I do expect to live to see one thing, and that is, lithotomy becoming very much rarer than it now is. You certainly will live to see it one of the rarest operations. I do not say that I look forward to that with any particular pleasure; for it is a grand operation, demanding all the skill, self-command, and force of a man. It is one of the best practical tests of a good surgeon, and looking at it from that point of view, one cannot desire its discontinuance: but it will disappear, most assuredly; and as it will be for the benefit of humanity that it should, we must acquiesce in the result.

Next week I shall place two stone patients on this table, and demonstrate the operation of lithotripsy for you here in my lecture on that subject.

LECTURE IX.

LITHOTRITY.

GENTLEMEN,—I shall place on our lecture-table two patients with stone in the bladder, one of sixty-two, the other of sixty-five years of age. One man has a stone about an inch in diameter; the other has two stones, each about three-quarters of an inch in diameter: and in both the composition is uric acid.

Now, if a patient has never had any instrument passed into the bladder before, and if the urethra is not capacious, it is desirable to pass a bougie two or three times before commencing ; this, however, is rarely necessary. In the present cases the urethra is not very sensitive ; it is large in size, and there is no occasion to do this. Next it is desirable that the patient should not be below his ordinary standard of health. You will not begin to operate when there is an attack of fever, nor unless the digestion is in fair order, and the bowels are acting tolerably well. Take care that you have the local organs, and the whole system, in as favourable a state as possible at the outset.

Having decided to crush, there arises the question of instruments. Now, I shall simply show you the kind of instrument which I have used, and also, to a certain extent,

what has been used in the past. I may say that lithotripsy, as an operation, owes its existence to the French surgeons, mainly to Civiale, but not forgetting Leroy d'Etiolles and others. My old friend Civiale, who died in 1867, at a good old age, and full of honours, was the first surgeon to crush a stone successfully; that was in the year 1822. It had also been done occasionally by patients themselves. In one case a man had managed to grind down with a small file a little stone in the bladder, and that has been called lithotripsy. But the first man who systematically performed the operation on the living patient was Civiale, and he operated on his first two patients before the Academy of Medicine, with this instrument that I hold in my hand. You see how different it is from anything we now employ. It is a straight instrument, with a central axis and three claws, which were made to project after its introduction into the bladder. [The manner of using it is shown.] You see what a very different mode of proceeding that is from the method now adopted. Yet that was, to a certain extent, a successful operation. I cannot now carry you through all the stages by which the various improvements originated, but the next great change was the curved instrument. This was a considerable step in advance, and the curved form, with slight modification, is still the prevailing form with all operators. But here is an old pattern, worked with a simple thumb-screw in the handle, which still holds its ground, I regret to say, in this country. It has long been exploded elsewhere, although still used in London. Nevertheless, it is the instrument with which Sir B. Brodie earned his success, and is used thus. [Explanation.] You see how long a time it takes, and how much movement is necessary with it in the bladder. You cannot do any respectable amount of crushing in less than five

minutes in this way. A great improvement upon that instrument was made by Civiale and Charrière, of Paris. The object was to avoid the loss of time and the jar occasioned by screwing and unscrewing, and in this new instrument the sliding movement is instantaneously changed into a screw movement, and *vice versa*, by the turning of a disc in the handle. [Instrument and method exhibited.] Meantime Sir William Fergusson devised and adopted the rack-and-pinion method, which is an improvement on the old instruments before described. Lastly, I show you a lithotrite, due in part to my own design, and in part to Messrs. Weiss, which is now so widely used that I must notice it also, especially as it is that which you always see me use here.

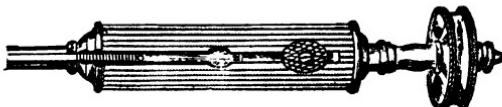


FIG. 21.—The handle of this lithotrite is shown; as it is this which affords the power to operate with great facility.

Various "modifications" of this instrument have been made by instrument makers and others, with the result only, as far as I have seen, of impairing its power in some way, and evidently devised through ignorance of the proper mode of using it.

In what respect does it differ from others? In this, that it enables you to operate in less time, and with less movement or shock to the bladder, than any other instrument; and not only the amount of movement, but the matter of time also is a matter of importance. It makes a good deal of difference to a patient whether you retain in his bladder an instrument for three minutes or for one minute. If you pass a bougie into your own bladder at once and withdraw

it, you may experience very little discomfort; but leave it there for three or four minutes and see how you like it. Every half minute after the first the pain increases. The mere sojourn of the instrument in the bladder is a source of irritation precisely corresponding to the time, within certain limits, it continues there. Anything, therefore, that will diminish the time of the operation, and the amount of movement and concussion, will necessarily give a greater prospect of success.

Now, for the proceeding itself. There is no operation that I know which demands attention to so many minute details, all of them being very important. For its successful performance, it is essential that the surgeon should not only attend to the operation pure and simple, but to all the details connected with the case. Lithotripsy neglected had better not be done at all. Either let it be done according to certain principles, and with great attention to detail, or let lithotomy be performed instead. One naturally recoils from many details; it is therefore essential to find out what principles regulate them. And, happily, these are very simple. What is the problem to be solved? It is the removal of a stone without injury to the bladder, either in employing the instruments, or by the action of the fragments themselves. That is what we have to aim at, and if accomplished success is certain.

Now, I need not say that by any cutting operation that is impossible. There is at the outset a severe injury to the patient in the shape of a large and deep wound, and it is this which, in any form, is always a risk. Let us see how far we can hope to solve the problem by lithotripsy. All the chances of injury possible arise from these two sources: the stone itself, and the instruments used to extract it.

First, the stone. In its natural condition, as we know, it occasions no dangerous injury to the bladder, although it causes much pain, and ultimately chronic disease. But when it is broken up into large angular fragments with sharp edges, it becomes a source of injury, and severe cystitis may be thus readily induced. It is in accordance with my principle that I advise that these should be pulverized one at a time; you do not attack them all at once, and break them up indiscriminately into sharp pieces. Then you will take care that this débris is not hurried away when first made, and while it is sharp; if it can remain in the bladder two or three days before it passes, it will become somewhat water-worn, and will pass more easily; at the same time the urethra will be less sore, and in better condition for its transit. The patient should at this stage be kept at absolute rest, so that the fragments may not be moved more than is necessary. It is as well, also, sometimes to promote the flow of urine by giving diluents and diuretics.

Secondly, the instrument used, and the method of manipulating it, may be productive of much injury, both to the bladder and to the urethra. It has, therefore, been an object with me to lessen, as much as possible, the number of instruments employed, the amount of manipulation applied to them, and the time devoted to the process. I have shown you how, in conformity with this principle, I have endeavoured to produce an instrument which should give the least possible irritation. And I will only add, that if we can get an instrument which will do its work with less disturbance still, it will be, *pro tanto*, a valuable step in advance.

Now as to diminishing the number of instruments used. Formerly it was laid down as an axiom that you should never use a lithotrite in a patient's bladder, unless it contained a

known quantity of urine or other fluid. Hence the urine was always withdrawn before introducing the lithotrite, and four or five ounces of water were injected. I have shown that these preliminary injections are wholly unnecessary, and I never use them—never even asking a patient to hold his water beforehand, nor when he micturated last. It is said, “If there is only a small quantity of water, how can you be sure that you will not injure the coats of the bladder in endeavouring to seize the stone?” There is no difficulty in that respect, because these instruments are so constructed that you could scarcely lay hold of the bladder with them if you tried to do so. When you had instruments in which the blades closed upon each other accurately it was different. But these blades never do so: hence the safety of the instrument.

Then there is another species of mechanical irritation which may be met with. It was common—and it is now with some surgeons—to withdraw large fragments of stone from the bladder through the urethra. The surgeon would lay hold of them with the forceps, or with some other contrivance, and would really seem to think he had accomplished something to be proud of if he drew from the bladder a calculus as large as a bean. Now, in order to draw out such a calculus, you must first catch it. Well, if you have once caught it, why not give it one turn of the screw and reduce it to powder? Why subject the neck of the bladder and the urethra to pain and injury by dragging through a distance of six or seven inches, through a delicate and sensitive canal, a sharp angular fragment of stone? So far from looking upon it as an achievement in surgery, I look upon it as a thing especially to be avoided. Never, then, on any pretence, withdraw an instrument containing a fragment

or débris too large to pass easily through the urethra. Our object is mainly to crush the stone into small broken material, which will then pass harmlessly and easily enough. Again, it was the custom, after crushing, to inject repeatedly and forcibly several ounces of water into the bladder, the patient being placed upright, in order to remove the fragments just made. Now, this is an irritating process, more so often than the use of the lithotrite, and for the reason just named I regard it as a useless and meddlesome proceeding. You see, then, that we get rid of the preliminary injections, the after injections, and also the withdrawing of the fragments. As a rule, everything is to be done with the lithotrite. One good flat-bladed lithotrite will do seven-eighths of all the work. Other means, Clover's apparatus for example, which is the best of all, may be employed in exceptional cases.

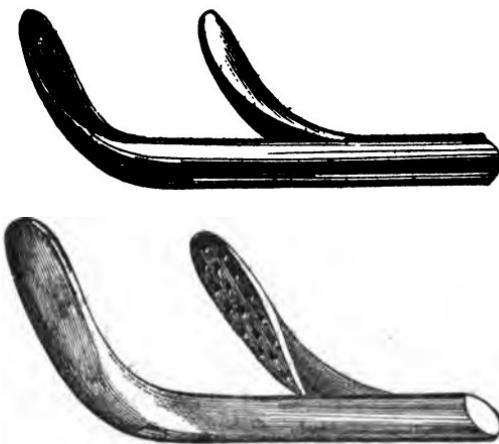
Having enumerated what I believe to be the simple principles of lithotomy, I will further illustrate the practice. Usually, when you have a large and hard stone to deal with, it has been the practice to begin with the fenestrated instrument—that is, one in which the female blade is entirely perforated, allowing the male to pass through it. This is



FIG. 22.—The fenestrated lithotrite.

always a more or less dangerous instrument; and is to be employed as little as possible (Fig. 22). I never use it unless

the stone is actually so large that it cannot be crushed by the flat-bladed instrument. Indeed, now I never use it. I have not put such a lithotrite into the bladder for the last three years. A good flat-bladed instrument, properly handled, will crush every stone that ought to be crushed, and that which it cannot do should, as a rule, be reserved for lithotomy. For example, you have just seen me crush an oxalate-of-lime calculus, of a full inch diameter, in Ward 9: as successful a case as we have ever had. It was very hard, no doubt; but by a rapid turn of the screw, you saw how it gave way, and then the smaller fragments were dealt with in detail after (1872). Without great confidence in the quality of the instrument, I would not have attempted it; nor do I think the result would have been possible with French lithotrites of this kind, since they are less powerful for their magnitude than those which are made by the best



Figs. 23 and 24.—Lithotrites with flat blades.
makers here. The edges of a fenestrated instrument meet, and

are sharp, and the fragments made by it are rough and irritating. Always use the lithotrite with flat blades—blades which reduce the stone to powder. The blades do not meet each other, and will not injure the bladder, and the movement altogether is easier than that of the other instrument. [A patient is brought in.]

I have told you that there is a difference in the mode of introducing the lithotrite and the catheter. You know that in passing a catheter, we, in this country, stand on the left side of the patient; in France, the surgeon stands on the right side. In passing the catheter for a recumbent patient, you hold it somewhat horizontally, draw the penis gently over it, and give a gentle sweep, in this way, into the bladder. In passing the lithotrite a different movement is required. You may stand on either side, but it is better to be on the right side, because that is the convenient side for operating, and it is awkward to go round the patient to operate after passing the lithotrite. Well, then, standing at his right side, and partially turning your back to his face, you let the lithotrite slowly and easily find its way until the shaft reaches nearly the vertical direction. Arrived at this point, you retain it in that position for a few seconds, allowing it to go on, still so placed, by its own weight, in order that it may slip under the pubic arch. This done, you gently depress the handle, and it slides readily into the bladder. There is no more easy instrument to pass than the lithotrite with proper management. I have now introduced the lithotrite, and have to find the stone and seize it. In order to do this I simply open the blades and close; the stone is between them. I touch the little button here, which changes the sliding movement into a screwing one, turn the handle and crush. I then disengage the but-

ton, again open and close, and now I have a large fragment between them, and, repeating the action, again crush. A good quantity of débris results; less than a minute has been occupied, and I withdraw the lithotrite slowly and gently, and here is some of the débris, which you see is uric acid, between the blades. There is no trace of blood, and the patient has made no complaint of pain. If you ask him he will, I dare say, tell you it was not agreeable; but it is nothing to take chloroform for—nothing like extracting a tooth, for example. Now we will have another patient [who is placed on the table, the other walking away]; he has had two sittings before, and knows all about it. I introduce the instrument in the same way as before. I open and close the blades, and find nothing. Turning them to the right, I feel nothing; turning to the left, I feel nothing. I then depress the shaft, and turn the instrument over, so that the blades are reversed and point downwards; I open and close, and seize a small fragment deep behind the prostate. Having crushed that piece, I open and close in the same position, and find one a little larger, and having crushed it I withdraw the instrument. This is always rather more painful for the patient than when the stone is found in the usual situation, and it occupies more time, perhaps two minutes instead of one. It is not usual to have a case of so much difficulty, if you call it difficulty, as that.

Now let me give you a hint about crushing, which is a very useful one. Whenever you have found a stone, or a good-sized fragment, and have crushed it, keep the lithotrite exactly in that place, and although you may have had some trouble in finding it, you will now continue to find it several times running. It reminds me of fishing for perch;

when you have caught one, you may catch, perhaps, twenty or thirty more out of the same hole, if you will but stop there, and not go fishing about among the shallows. It is the same in lithotritry. You will go on seizing and crushing if you contrive to keep the lithotrite precisely in the same place. In fact, there is what may be called a certain favourite "area" in every bladder in which to operate—a certain spot which is a favourite haunt, so to speak, for fragments of stone. If you find that out in each bladder you will always be able to crush; if you do not, you may often have some difficulty in discovering your stone. The area will, of course, vary somewhat with the position of the patient. If the patient was standing, for instance, the area would not be the same as in a lying posture. It is best to raise the pelvis two or three inches; then you get an area for operating which is not too close to the neck of the bladder. The neck of the bladder is a very sensitive part, and you should always avoid it, because in pulling out the male blade you may impinge against the neck of the bladder if you are not careful. One of your maxims in lithotritry should be never to pull out forcibly the male blade. You should pull it out carefully and delicately, so as to *feel* the neck; and it is a bad lithotrite, remember, if the male blade does not slide with perfect ease. This diagram will show you what I mean by the area for operating. If the patient is lying without a cushion, it will be nearer the neck of the bladder than if the pelvis is well raised. In the last case you saw just now, the man had an enlarged prostate, and when the lithotrite was introduced the stone was not found, as you saw, until the lithotrite was reversed. It is more essential in the case of an enlarged prostate to put a high cushion under the pelvis, in order to throw back the fragments to the posterior part of

the bladder, so that the area may be as far from the neck as possible.

You ask, perhaps, how often is it right to introduce the lithotrite at each sitting, and how much débris should you withdraw on each occasion? The answer depends on several considerations. First, it depends on your own facility of hand. A may introduce a lithotrite three times, crushing each time, and removing some débris easily on each occasion, with less of resulting irritation to the patient than B, who only introduces the lithotrite once, but does not do it happily. Secondly, one patient may bear three introductions better than another can bear a single one; that patient having larger or less sensitive passages than this has. Thirdly, there are special circumstances which sometimes render it necessary in any case to hurry on the operation and empty the bladder as soon as possible. For example: the fragments of the last sitting, being sharp, have produced much pain and cystitis. Each day you observe the urine thicker with mucus, and the mucus acquiring daily a more decided blood tint. In such a condition I operate at once and remove all I can, usually placing the patient under the influence of chloroform for the purpose. It is a mistake to wait, and to treat the cystitis by the usual remedies; these will be useless, as long as the exciting cause remains. You should break up the large fragments, withdraw the débris with care, and immediately afterwards you will find the urine much clearer and the patient improved. I lay much stress on the importance of this prompt and decided action. Probably in two or three days the urine is again thick, and again you should operate in the same way, by which time you have perhaps removed the whole of the irritating matter, or nearly so. Fourthly, in the case of a patient who has no

natural power to empty his bladder, and does so solely by catheter, and has consequently almost no power to pass the débris you have made, it is necessary to crush freely and to remove results. And you may do this fearlessly, always provided that you do it well, for the urethra in these circumstances is accustomed to instruments.

The case in which you must exercise the most caution, and not use instruments too much at first, is that of the fresh healthy-looking patient from the country, who has scarcely had a day's illness, has led an active life until lately, and never had an instrument in his urethra. This man will bear the operative proceedings necessary for lithotritry worse, as a rule, than any other patient, unless you begin very easily: unless we except only the man who is thoroughly broken in health, and has either advanced chronic pyelitis, or renal disease.

As a rule, then, at first commence with one introduction of the lithotrite, crushing four or five times during a sojourn, say of two minutes, in the bladder, which I will allow you, although you know I do not occupy so much time myself; then withdraw a moderate quantity of débris in the blades—that is, as much as you find comes through the urethra easily. Give it time in withdrawing, so as not to scratch or tear the mucous membrane at all. The external meatus is often small, and here the removal may be the most painful part of the whole operation. If so, just divide it with the little bistourie cachée.

With regard to familiarizing yourselves with the manipulation of the lithotrite, there may be some advantage in operating on dead bodies. But there is a great difference between the feel of the thing in the living and in the dead body. The conditions encountered in the mere flaccid bag

which constitutes the bladder in a dead body is very different to that in the living. If you have a master to give you lessons, it may serve your purpose, but not nearly so well as in the living body.

So much for the sittings. But it is of great importance to watch well the patient afterwards. You heard me say in the theatre the other day, and I may shortly advert to it here, that you should not encourage the early passing of the fragments. They rest at the bottom of the bladder; and I usually keep the patient in bed, and pretty much on his back, for thirty-six hours or so afterwards; he should, at all events for that period of time, pass urine in that position, so that the sharp angular fragments are left at the bottom of the bladder, and are not forced into the urethra. This used to be, and still is, much neglected, and the consequence is, that if a man has an urgent want to pass water, he will get up and strain. The sharp fragments are driven into the neck of the bladder by the effort, and bleeding, pain, sometimes inflammation of the prostate or of the testicle follow. But by adopting the position named, the sharp fragments get water-worn, and the urethra, which has been irritated, and is perhaps a little swollen from the contact of the instrument, recovers itself, and the passage and fragments are better adapted to each other than before. I believe this is not taught anywhere but by myself; it is a very simple matter, but an important one. Never allow a man who has been subjected to lithotomy to micturate in the standing position between the first and the second sitting, when the fragments are all large and sharp. When you have crushed two or three times, perhaps, he may get up and make water occasionally; but after each sitting, for twenty-four or thirty-six hours, he should not pass water in the erect posture.

Immediately after a sitting, a hot linseed poultice may be placed above the pubes, and is a comfort to the patient. The bowels should act the day before or on the morning of the sitting, so that the patient may not have to rise soon after and strain.

Now, suppose that we have—at five, or six, or eight sittings, according to the size of the stone—almost if not quite removed it, a very important duty remains. It has been objected to lithotripsy—and there was some truth, perhaps, in the allegation formerly, but not now, if the operation is done well—that you never make sure of getting rid of the last fragment; that you might leave a portion to become the nucleus of a future stone. But there is very little more difficulty in getting away the last fragment than any other, provided you go the right way to work. Generally speaking, in four cases out of five, the last fragment passes as the others—that is, by the patient's natural efforts. But suppose there remains a bit too big to pass—suppose you have reason to believe this from the continuance of the pain, &c.—you then take an instrument with short wide rounded blades, with which you can explore easily in the reversed position. With such a one you may thus search the whole floor of the bladder with perfect safety. And here the cylindrical handle is of great value. It can be lightly and quickly rotated in the most delicate manner between the thumb and index finger, and should be so used (that is with the blades reversed) close behind the neck of the bladder.

It is quite easy to procure an audible note from a fragment no bigger than a split pea, by this means, as I have, times without number, demonstrated in the wards and elsewhere, by withdrawing the little bit entire after it has been struck. With this form of handle and with no other that I know is

this possible. Now, supposing that you have made your final explorations, and still have a suspicion that there may be a portion left somewhere—and some symptoms remaining and nothing found to account for them,—what is to be done? You do not know whether these symptoms are due to a fragment of stone which escapes you, or whether to the irritation arising from the long residence of the stone in the bladder, and also to a certain extent, to your instrumental efforts to find it. This is what I advise: wait for a week and see whether the patient is better, and if there is any doubt at all about it, make him take some severe exercise. I do not know anything here in London better than a long omnibus drive. Tell him to expend a shilling in omnibuses—say between Mile End and Kensington,—and if that does not find out the fragment in a man's bladder, I scarcely know what will. If he can stand that, especially if the roads are mending—if he is not worse for such a journey,—rely upon it he has not any fragment left: the irritation is due to the state of the bladder, and not to a fragment. If the latter exists, the patient will to a certainty be the worse for his drive, and perhaps there may be some bleeding. I admit that it is difficult to tell sometimes, although very rarely, what the irritation is due to; and it is only by waiting and testing in some way that you can find out.

Then there is another very good mode of getting rid of the last fragment, and also of removing fragments at any time when they are not well expelled by the natural efforts,—I mean the apparatus of Mr. Clover, who, well known by his chloroform instrument, has also given us a valuable addition to the instruments for lithotripsy. It is a very fascinating apparatus, and looks so well that there is some risk of its being used when not required. There are certain

conditions in which the fragments never come away well. For example: for the patient who has no power of making water, except by a catheter, the apparatus in question is sometimes the very thing. After crushing, a very capacious catheter with a large aperture is introduced, and the fragments are sucked out by the action of this powerful india-rubber bottle which is attached to it. The process is rather trying, however, for the bladder; and it costs rather more pain and time than an ordinary sitting for lithotripsy.

One troublesome thing that very rarely happens is the impaction of a fragment. If you adopt the system of lithotripsy which I have shown you, it is remarkable how seldom that happens. I have never had to open the urethra to remove a fragment in my life. I have occasionally had to remove one by the forceps, but that is very rare; and among all the complicated inventions for the purpose, I know nothing so good as the common long forceps which I show you here. During the last three years, certainly, I have not even had occasion to use them. The more thoroughly you crush the stone, the less use there will be for forceps. Here is a bottle containing what I call a well-broken stone. You see it is almost powder: a very different sort of thing from that in the other bottle, where you see a large number of big fragments that were probably passed with difficulty. It is an old saying, "a carpenter may be known by his chips:" certainly the skill of the lithotritist may be known by the débris he makes.

One other point I have to mention—namely, should you employ chloroform? Some operators prefer it. Now, first of all, I think the operation ought not to be sufficiently painful to make chloroform necessary. If it was like extracting a tooth, I should give chloroform. But there is a better

reason than that for not giving chloroform : without it you can better judge of the susceptibilities of the patient at the time. On some occasions the bladder is more irritable than on others ; and if the patient suffers much, you do not have so long a sitting. If he scarcely suffers at all, you go on "making hay while the sun shines," and crush three or four times. On ordinary occasions, two separate introductions of the lithotrite suffice. Too much lithotripsy, when the bladder is irritable and painful, is usually an equivalent to doing the patient some mischief. This is a point as to which you cannot judge, if chloroform is administered. It has been said that chloroform should not be given, because if the patient is not under its influence, he will call out if you seize the coats of the bladder in mistake for the stone. That is altogether an error. The coats of the bladder should never be injured, and with proper instruments it can scarcely happen.

I had intended to speak to you of certain contingencies that may happen, but it is now too late to dwell upon them. I will simply name them ; they will come into consideration in their appropriate places in subsequent lectures. The first contingency is fever ; secondly, bleeding ; thirdly, cystitis, just referred to ; fourthly, orchitis ; fifthly, retention of the urine ; and lastly, exhaustion, which is sometimes fatal. A peculiar kind of feverish attack is, as you know, common after all instrumental operations on the urethra. The phenomena of cold chill, dry burning heat, and sweating, proceeding in this order more or less severely. Do not "meet these symptoms" by a too active treatment ; I know none of much service ; when the patient is thirsty, give him drink, and don't press food on him until he is somewhat disposed for it. Rely on it, what we call fever here, is

nature's struggle against some poison in the course of elimination; only take care that the hygienic conditions are good. After the attack he is weak, and requires good and nourishing food.

Bleeding, as a result of the operation, is very rarely troublesome, and does not require much treatment. Cystitis gives a little trouble occasionally, and is to be treated in the ordinary way described in our course. Inflammation of the testicle requires you to desist for a time from operating. Chronic retention of urine is apt to occur very insidiously—not absolute, but partial retention. Always look out for it, if frequency of micturition increases, and the urine becomes increasingly thick, and pass a soft flexible catheter with all the gentleness you are master of; and if you find that the bladder does not empty itself by its own power, you must repeat the process once, twice, or more frequently, according to circumstances, in the twenty-four hours. Sometimes exhaustion occurs; after a number of sittings the patient's strength gives way. That, however, is very rare.

In my next lecture I shall take the subject of lithotomy, and give you a general sketch of the different modes which have been practised, and which are being used at the present day.

LECTURE X.

LITHOTOMY.

GENTLEMEN,—It was understood, as the result of our discussion in the first lecture on Stone in the Bladder, that all cases below the age of puberty, with very few exceptions, should be cut; those only in which the stone is quite small being reserved for lithotrity. Then there were certain adult cases, where the stone is large, or other difficulties exist, in which the operation of cutting must be performed. Hence we have next to study the operation of lithotomy, and this advantageously follows the consideration of lithotrity.

The proceeding of "cutting for the stone" has always been a subject of extreme interest; indeed, you will find no operation that has exercised a greater fascination for the veteran operator, while there is none which more excites the ambition of young surgeons. There is none respecting which an old student comes to his teacher here with so much just pride and happy sense of newly acquired power, as when he tells him, "I have just cut successfully my first stone case down in the country." On the other hand, the true surgeon who loves his art, is always at home when the theme of discussion embraces the history and practice of lithotomy, and I verily believe that some acquaintance with the former is one of the best ways of commencing a study of the latter. I will therefore give you a sketch, although it must be very

slight and meagre, since the literature belonging to this famous subject would of itself stock a library, of the different stages by which lithotomy has arrived through earlier periods at its present condition.

The first record we have of lithotomy is in the Augustan age. I shall speak first of lithotomy under the Classic period, which operation continued, as far as we know, unchanged throughout the middle ages. Secondly, of improved methods which arose with the revival of letters; and lastly, of the operations adopted during the last and present century, marked as this period is by disregard of ancient authority as the sole and sufficient guide in all matters which are determinable by experiment and observation. I dare say there was an earlier period still, even before the time of Celsus, the author of the first account (who, by the way, was a physician, and never operated); and if some enterprising Lyell in surgery would make the inquiry, he might find traces of a pre-historic period; because wherever there are human remains, calculi must exist. I do not know that uric-acid stones would endure long. We know that the excreta of fishes are preserved for thousands and thousands of years, and I doubt not that some of these human excreta might be found also, and that oxalate-of-lime calculi, at least, must exist, among other human remains. As so many observers are seeking the early records of the human race, I throw out the hint; and certainly, if I were so searching, I should not forget to seek, among other things, the matters in question. Whether we shall thus ever find any instruments which could be identified as the means by which those stones were removed is doubtful. We will, however, not occupy our time with speculation, but will be satisfied to begin with such facts as we can find, say about

2,500 years ago. More than 2,000 years have passed since Celsus wrote, and hence I have named that date, as the operation was evidently an established practice at that time. Hippocrates speaks of it, although he made his pupils take an oath that they would never practise lithotomy. For then lithotomy was an occupation by itself, and not a very exalted one in popular estimation, being only practised by certain itinerant performers. What they did was described by Celsus in his seventh book, and it was called "cutting on the gripe." The method was simple, and so were the instruments, on which account they were afterwards termed the "apparatus minor," to distinguish them from the "apparatus major," which came into vogue in the second period. The operator commenced by placing his patient, usually a boy, upon the knees of a man who was seated. If it was an adult patient (but such were rarely cut), two men sat side by side (their legs forming the operating table), so that their arms might clasp the patient and control his struggles. The operator used no staff whatever, but inserted two or three fingers into the rectum, and endeavoured so to feel the stone, which he could only do if it was large. If he succeeded in this, he fixed it firmly, or "gripped" it with the ends of his fingers—hence the term "cutting on the gripe;" and pressing it down towards the perineum, he made a semi-lunar cut with a broad scalpel until he reached it. Then, if unable to press it out with his fingers, he drew it out with a hook. Now this rough-and-ready mode was extant until about the sixteenth century; indeed, up to the seventeenth century it was largely practised in Europe. Even in the latter part of the seventeenth century, when Frère Jacques appeared, the ancient mode of cutting on the gripe was chiefly practised.

We now come to the second, or period of the Renaissance, when at least three different operations appeared. Appropriately enough, too, a brother of one of those monastic orders which had cherished and exercised most of the arts hitherto, figures now as the most famous operator.

First, we will consider the "Marian method," or "apparatus major"—a median operation, originated by Johannes de Romanis, but receiving its name from his pupil, Marianus Sanctus. It is called the "apparatus major" because, while "cutting on the gripe" required only a knife and a hook, this table would be scarcely large enough for the instruments employed for the Marian operation. They are not here, but you may see them at the College of Surgeons. By this method a vertical incision was made by the side of the raphé, and the urethra was opened on a staff at about the membranous portion. A dilator was then thrust into the wound, and another upon that (male and female dilators they were called), and the canal and the neck of the bladder were torn asunder with great rudeness. Its only resemblance to the present median operation is, that the incision is in nearly the same place. But anything more barbarous than the practice you can hardly conceive. The stones were larger then than they are now, and the incision was small; and in order to dilate and extract, various machines were employed, the result of much mechanical ingenuity, and forming the origin of many of the surgical instruments now in use. It was a very unsuccessful operation, and was gradually lost sight of in consequence. Still it held its ground in places, and for certain cases, as late as to a part of the eighteenth century.

Next I shall name the high or supra-pubic operation, which appeared about the end of the sixteenth century, and

this has maintained a position of greater or less importance to the present day. More than this I shall not say on the present occasion, as we concern ourselves mainly with perineal lithotomy.

I now come to a new proceeding, which rudely shadowed forth our present lateral operation. It was performed on a staff, which was not grooved as now, but yet it roughly served as a guide into the bladder. The operator commenced by thrusting a long knife into the ischio-rectal fossa, and so on into the bladder behind the prostate, and, cutting forward, he made the entire wound at one incision. Invented, as it was believed, by Pierre Franco (sixteenth century), its apostle and promulgator was the celebrated Frère Jacques, who flourished in the seventeenth century, and is said to have cut 5,000 times for stone. Probably he did not cut 500; but a cipher more or less was a trifle for the inexact and credulous mind of the period. Like others of his craft, he was an itinerant operator, not embarrassed with too much anatomy, and France was mainly the scene of his labours. After him, Rau, in Holland, pursued the same practice.

It will be interesting to you to know what was going on meantime in our own country. Most patients, up to the end of the seventeenth century, who were cut, submitted either to the old operation "on the gripe," or to the "Marian." In the beginning of the eighteenth century, the high operation was first practised here. At this period there came to London a Leicestershire lad, subsequently known as Cheselden, the celebrated surgeon of St. Thomas's Hospital; and he at first did the high operation. But he had heard of the recent successes of Frère Jacques' method, and tried it, modifying it as his experience suggested, until he performed almost

exactly what we now call the lateral operation, and with the best results. His success was so great, that in 1729, when he had performed the operation several years, and cut about one hundred patients, Morand, the French surgeon, was sent from Paris to see him operate, and report upon the subject. He remained here for some time, Cheselden getting together a number of cases and operating on them before him. Morand then returned and reported to the French Academy so favourably on the subject, that Cheselden's operation became generally accepted as the best. In it the deep incision was made, if possible, within the limits of the prostate gland, and involving its left side only, by means of a scalpel of moderate size, cutting its way inwards along the groove of the staff. A few years afterwards Cheselden retired, having cut 213 patients of all ages, with ten deaths. Those are the first figures that we can depend upon in connection with the operation, for, as I have told you before, the figures of the Mediæval period are monstrous and incredible; for not only was the famous monk said to have cut 5,000, but to have lost "scarcely any." Cheselden, who improved the mode, and cut at all ages, including very many children (who are, as you know, extremely safe to cut), had barely five per cent. of deaths, which was an enormous result, and no doubt the greatest that had been yet made.*

* No statistical accounts of operations on calculous patients are of any value whatever, unless the age of every patient is given. No inference can be drawn with reference to mortality, unless we know whether the subjects were under puberty—of young, adult age, or in advanced years. Thus, roughly speaking, not more than one death in twenty cases ought to occur among children, perhaps less; while the deaths will equal the recoveries from lithotomy for large stones which cannot be crushed, in men of seventy years and upwards. Lithotomy in middle life for stones of moderate size is a

At this point the operation continued for some years until the end of the century, and then "the gorget" came into fashion. A few years ago a patient was rarely cut without it; now, I suppose, few of you know what it is. Originally, one of the directors used in the "apparatus major," its edges were sharpened for the purpose of making the deep incision through the prostate. This was the idea of Sir Cæsar Hawkins, whose name was affixed to it; but subsequently almost every surgeon had his own gorget, making it wider or narrower, or altering it in some fashion or another. A great deal of mystery has been made of this instrument, but it is simply a wide knife with a beak at the end, which is kept in the groove of the staff. In using the ordinary knife, if you require a deep incision, the blade must leave the staff a little. The object of the gorget is to make an incision sufficiently deep without leaving the staff. Here is one which formerly belonged to Scarpa, the celebrated anatomist, and here are others which, having been used by many celebrated operators, have fallen into my hands, and they are leading types of the instrument.

In 1816, Dupuytren, of Paris, not being content with the lateral, introduced his bilateral operation. His object was to make the deep incision by a cut on each side of the prostate, instead of one large one on one side only. And he, with the same view of limiting accurately the extent of the wound, designed a special instrument for the purpose. This, the "two-bladed lithotome," is also a member of the ancient surgical armamentarium, made more elegant and manageable successful operation; but lithotrity is more so, and has replaced the former among modern surgeons. It is essential, therefore, in order to draw a conclusion of any value from the entire experience of any surgeon in reference to this subject, that we should know the ages of the patients, and the operations, crushing or cutting, which have been performed.

able by modern skill. Instead of making the internal incision by pushing a cutting blade *inwards*, as with the knife or gorget, you carry this instrument [showing it] into the bladder along the staff, there open its two concealed blades, and drawing it towards you, cut your way *outwards*. You can arrange the blades so as to have the incision as wide or as narrow as you please.

In 1825 or 1830, the "median operation," often loosely spoken of as a revived Marian operation, came into some note in this country, and with it Mr. Allarton's name is chiefly associated. In the meantime Civiale, in Paris, combined the median and bilateral operations, and you have seen me frequently perform both of them here. Then Nélaton has recently performed the pre-rectal operation, which is, after all, only a carefully dissected bilateral operation.

I now come to the mode of performing the lateral and the medio-bilateral operations, and will give a few general hints which will apply equally to either. As I have said before, when we have to do with many details, let us try to revert to first principles, and define clearly the object we aim at. I told you that the object of lithotomy is to remove the stone without injury to the patient, either from the stone or the instrument. In lithotomy you must have a wound, and the object is to make it in such parts as shall least endanger the blood-vessels, the viscera, or the neck of the bladder, and to remove the stone through the lower outlet of the pelvis with as little mischief as possible to any of those parts. When that problem is best solved, we shall have the best form of lithotomy. It is open to discussion whether we have yet found out the best way, although we have been 2,500 years—to say nothing of the pre-historic period—in coming to our present position.

Now, in order to aid you to solve the problem for yourselves, I have placed before you a diagram drawn accurately from the preparation, showing the bones and ligaments of the pelvis, in the position for lithotomy. The lower outlet is opposite to us; it is in the patient filled by soft parts, and it is the opening into which you have to cut, and through which you must remove the stone, and in all that you do, you must be limited by its boundaries of bone. I like to have that in my mind's eye when the patient is tied up and I take my seat to operate. Here also are diagrams, showing two stages of the dissection of the perineum. But I take it for granted that you know your anatomy too well to require any detailed account here of the important parts involved in the operation. I shall simply name those which concern us. First, there is the pudic artery, safely sheltered under the pubic ramus; but it gives a branch to the bulb, a vessel to be avoided at the upper part of the space. Then in the same part is the bulb of the urethra, which is not to be thought too lightly of; indeed, it is the source of some of the chief dangers; it is a vascular expansion from the vessel named, and cutting into it deeply is as bad as cutting into the vessel itself, if not worse. Next, there is the rectum in the middle and lower part, which it is also important to avoid. The other diagram shows the position of the prostate, which must be divided in the deep incision.

I will now very briefly touch on the principal steps of the operation. The patient's bowels are to be thoroughly emptied by an enema a few hours before. Do not trouble yourself about the quantity of urine in the bladder. Some think it very important that it should be full. Cheselden, on the other hand, preferred it to be empty, saying that in

this condition the stone was easily found close to the neck of the bladder. I have seen great pains taken to inject the bladder before operating: but the unconscious patient has usually succeeded in emptying it, in spite of tying the penis, and such-like precautions.

The first thing the operator does is to pass the staff into the bladder and find the stone. Never think of cutting a man if you are not fully satisfied that the staff is in contact with it. Frightful blunders have been made through indifference to this rule. Suppose, for example, the staff is in a false passage, and is not in the bladder at all; one shudders at the idea of an operation performed on a staff so placed—an exhibition distressing to all concerned—never to be forgotten either by the operator or by the bystander, and probably fatal to the patient. The "click," then, is to be distinctly audible to yourself and to a witness, and the staff is to be put into the hand of your best friend, who is to attend implicitly to your instructions, and to no others, whatever they may be. The patient is then to be tied up firmly; better still if secured by these leather anklets and wristbands, devised by Mr. Prichard, of Bristol, because they truly realize the proverb, "fast bind, safe find," which our old friends the garters often did not.

Now, what are the instructions to your friend, the staff-holder? You want it held firmly, and, of all things, not to leave the bladder. I don't think you will gain much by cultivating a fancy for any particular spot, such as right or left, or projecting in the perineum. If it is to be steady, always in one place, which is the main thing, there must be a point of support for it to rest against, and there is but one such spot in the whole region. Rely upon it, then, you had better tell him to keep it close to the arch of the pubes, well

hooked up, with the handle pretty nearly vertical. Your fingers now traverse the region and find the lines of the rami, also the condition of the bowel, whether empty and contracted, or the reverse.

Now, relative to the first incision, different authorities advise different places at which to enter the scalpel and commence. Without discussing these, let me say that, as a rule, the usual point should be, for an adult, about an inch and a quarter in front of the anus, a little on the left side of the raphé. Go in boldly, slightly pointing upwards, near to or into the staff, and then gradually less deeply till you come out about three inches lower down towards the inner side of the tuber ischii. It is very pleasant to feel that you touch the staff in that first incision, and it saves trouble and uncertainty to have gone close to it, which you always ought to do; never let it be a timid shallow cut, merely dividing the skin. The end of your index finger follows, and should feel the staff easily through the tissues. Fixing the finger-nail upon it, the point of the knife is placed firmly in the groove, and is run steadily on in contact with the staff. Keep the point up, and you will be safe; let it down, and you may slip out and get into the rectum, or nobody knows where. Simply go on, letting the blade be a little more horizontal as it proceeds. Go on till you are well into the bladder, not letting the point leave the staff. The depth of the incision will depend upon the angle which the knife makes with the staff: if you withdraw with the knife close to the staff, of course you will only make a wound the width of the knife; and if the edge is directed outwards and downwards against the soft parts, with a light hand, as you come out, you will make a freer and cleaner opening. It is better to be rather free in cutting than otherwise [the

presence of a large stone is assumed], but you must not make the incision too wide. There has been a great deal of good advice expended upon this subject—the depth of the incision, but it is manifestly impossible for one man to make another understand what he means or what he does by any amount of talk. My belief is, however, that the result of our anxious care about this matter is, practically, that we are apt to cut rather too niggardly than too freely, and that the neck of the bladder, in consequence, receives severer injury from the stone and forceps than it otherwise would receive from the knife. This relates, of course, to adults; for in children you can scarcely find the prostate—it weighs but a few grains, and does not come in for a moment's consideration, and your knife goes far beyond its limits; yet these little patients are the safest to cut. Of course there is a very great difference in the two ages, due to the different conditions of puberty and childhood. To return. The incision being completed, your left index finger immediately follows close along the staff into the bladder, where you will probably just touch the stone. The finger goes firmly and deeply in, stopping the urine perhaps to some extent in its outflow, and accomplishes some dilatation of the parts. Then you slide the forceps closely along the palmar surface of the finger, and insinuate them into the bladder, which makes dilatation number two. Then, generally speaking, you have but to open the instrument carefully, yet widely, one blade flat at the bottom of the bladder, the other towards the top, and, closing the blades, the stone is probably between them. If it seems that you have a good hold, draw gradually outwards and downwards, easing or adjusting, if you can, with the left index; and so you make the third and last dilatation. Remember not to pull out horizontally and

bruise the parts against the pubic arch, but downwards into the widest part of the lower pelvic aperture. And don't be hurried for the sake of anybody else. You and your patient are to be, for you, at this moment, the only persons present, and your responsibility to him must never be forgotten for an instant through the influence of bystanders and lookers-on.

I must now briefly add that you will search for a second stone, tie any vessel spouting within sight, perhaps inject a syringeful or two of cold water, and introduce a tube through the wound into the bladder if the hæmorrhage is free. The tube is provided with a kind of "petticoat" of thin cotton material round it, into which you can tightly squeeze some strips of lint, and so make pressure on the bleeding surface. If there is only slight bleeding, I prefer to have no foreign body in the wound; if it is considerable and continuous, I employ the tube and the lint. It may be removed in forty-eight hours or so, taking out first the lint, little by little, and finally the tube itself. Removing the patient from the table, he is placed in bed on his back, with one or two pillows under each ham, and the parts involved exposed to air and light, so that you see how the urine flows. The less meddling afterwards generally the better. The severe pain which is usually felt for a few hours after should be mitigated with full doses of morphia or opium. I commonly put a suppository, containing one grain of the former, into the bowel of an adult patient before he leaves the operating table.

I have only time to say a word or two about the median and medio-bilateral operations. For the median an incision is made in the line of the raphé from about two inches and a half above the anus, downwards as near to its margin as

is safe, for you want all the space you can get. Dissecting down to the staff, with a finger in the rectum, and opening the urethra in the membranous portion or thereabout, you carry a director on into the bladder ; your finger follows, and dilates, and then the forceps on that. I may tell you that it is generally performed by thrusting a straight bistoury, back downwards, in front of the anus, into the staff, and cutting upwards and outwards at one incision. I prefer the other mode. Manifestly this operation will not do for large stones, which mainly, thanks to lithotritry, are what we have to deal with now. Hence the applicability of the "median" is extended, by making it "medio-bilateral," and in this manner : Having performed the median, as just described, up to the point of opening the urethra, instead of introducing a director, you introduce the two-bladed lithotome, and when it is in the bladder you open the blades, and two moderate incisions are made, one right, the other left, as you draw the opened instrument outwards in the groove of the staff. These two operations I have now performed about thirty times, and I do not know, after all, that there is much to choose between them and the old "lateral." To make an accurate estimate, one requires at least 100 cases of each operation by the same hand. Nevertheless, I may say a word, finally, on the principle which essentially distinguishes these operations. They are the result of opposite convictions respecting the hazard of the knife. There is a set of men to whom anatomy is a bugbear, and who are afraid of cutting as much as is absolutely necessary ; and there are other men less timid,—mind, I don't say less cautious,—who regard the larger and freer style of operating as better than the small or fearful style. All surgeons, of course, tend more or less to fall into one of these two classes. The anatomical

school have devised a variety of median operations in order to avoid certain blood-vessels, &c., and they sacrifice space in doing so. They answer excellently well for small and medium-sized stones; but these are, or should be, crushed now, and we do not want any operation for such stones. The perineal operation which offers the most room, the recto-vesical excepted, is the lateral operation. All the others named are essentially median operations. Now, I am bound to say that formerly, judging theoretically, and performing less lithotripsy than now, I had a leaning to median methods, being disposed to think that they would be attended with less haemorrhage than the others. But I do not find this so in practice, and I have arrived at the conclusion that there is quite as much bleeding as in the lateral operation. I attribute this to the bulb. I regard the bulb as a large artery to all intents and purposes. You cut into that spongy tissue,—not in all cases, but in some,—and there is as much bleeding as if you cut the artery of the bulb, and more difficulty in controlling it. The bulb must be cut more or less in the median operation. The problem is how to get into the bladder without wounding the bulb, its artery, and the rectum; and I believe that a well-performed lateral operation more nearly accomplishes this, where a free opening for a large stone is required, than any other.

I cannot tell you which of these two operations is the easier; if anything, perhaps, the lateral. But here is the important fact, which is but beginning to be realized by the profession, viz., that only exceptional cases of large stone in the adult require any cutting operation, since all the small and middle-sized ones can be much more safely removed by the crushing process; and it is this fact which

is bringing these various forms of lithotomy under the full and serious consideration of surgeons at the present day.

The next lecture will relate to the early history of calculous disease, and the treatment best adapted for its prevention.

LECTURE XI.

EARLY HISTORY OF CALCULOUS DISEASE, AND THE TREATMENT BEST ADAPTED FOR ITS PREVENTION.

GENTLEMEN.—We have recently studied together and discussed very fully the various operations which are practised for the removal of stone from the bladder, and you have had the opportunity of seeing them performed many times, not less than eleven cases having passed through my wards in a few weeks, each one with a successful result.

But, satisfactory as all this is, it suggests to my mind very strongly that there remains an important question for us to consider; as important, indeed, as any of the preceding, and one which must naturally arise in all thinking minds. It is this: Is there not a period anterior to the stage of the malady already examined—a time at which we might prevent the formation of stone in the bladder, and so get rid of the necessity for removing it? Admirable as the results of operative means have been—perfect (one may almost say) as they have become, at all events so far as regards the crushing operation—great as is the triumph which surgery has achieved in removing stone from the bladder—I take it there are very few men indeed who would desire, if they could help it, to exhibit that triumph in their own persons; all would be infinitely better pleased if the formation of

stone were prevented, rather than removed, however cleverly you may perform the operation. This, then, leads me to the consideration of an important question,—Can we do anything to prevent the formation of stone in the urinary passages? It is, in fact, the early stage of this malady that will be the subject of our lecture to-day.

I commence by saying that I think a great deal may be done. But at the outset of the inquiry we naturally ask, What is the kind of stone (for there are several kinds) the formation of which we may hope to do most in preventing? All calculi are either of local or of constitutional origin. By "local," I mean formed by disease in the bladder itself, and not depending upon any constitutional conditions; by "constitutional," I mean formed by some vicious action, some error of assimilation, inherent in the system. Now, the large majority of stones are of constitutional, and not of local origin. When they are local, you know that we cannot prevent their formation except by mechanical means. Calculous matter, the elements of which are produced in the bladder itself, may be washed out, or may be broken and then washed out. But when stones are of constitutional origin—and we are going to refer to entirely these to-day—their elements are separated from the blood, and no mechanical mode of preventing their production can be entertained for an instant.

Now, from observation, we know that nineteen out of twenty of such stones have uric acid for their basis, the remaining one in twenty being oxalate of lime;* and, less commonly still, there are phosphatic stones which are of constitutional origin also. Therefore, practically, to all

* The deposits of oxalate of lime and of uric acid so often replace each other that the consideration of the latter becomes practically generally sufficient for our purpose.

intents and purposes, the problem before us is how to prevent the formation of uric-acid calculus.

Let us examine the early history of a case of persisting uric-acid deposit? First of all, let me say, going back to the root of the matter, that is generally more or less hereditary. As a single illustration of this, we have just seen a case of uric-acid calculus in the ward, and learned that his father had "gravel or stone for the last twenty years of his life." And my almost invariable experience is, that either calculus or gout, most commonly the latter, has been observed in the family of the patient who comes to me with one of these formations in his bladder. I believe it, then, to be very strongly hereditary. We speak of tubercular disease and of cancer as being transmitted by blood relations, especially the former; but I do not think even it is more certainly hereditary than the disposition to uric-acid deposits in one form or another. I make a point of asking the question of all patients who come to me with this complaint; and although I cannot at present furnish you with an exact numerical statement, I do know that in a very large majority either gravel or gout (for I wish to show you the identity as to origin of these two complaints) has existed in the preceding generation; indeed, it is rare to find it otherwise. This hereditary tendency varies in force or strength in different families. You will find some persons with persisting uric-acid deposits at thirty years of age, others at forty, others at sixty. Of course, the earlier the time at which it appears, the stronger you will infer the hereditary disposition to be, and the more obstinate, probably, will be its tendency to persist.

What, then, are the first signs of this condition in the patient? Usually, the first sign is that the urine deposits pinkish matter, on cooling, at the bottom of the vessel, or

the secretion may be merely cloudy when cold. Sometimes, too, a delicate film or pellicle, covers the surface, which reflects faintly prismatic colours. It is passed quite clear, becoming cloudy only when it acquires the ordinary surrounding temperature. This phenomenon, therefore, may appear more frequently in winter than in summer, because the external temperature is lower. It is simply a deposit of salts from a hot solution as the liquid grows cooler, all being easily dissolved by raising the temperature of the liquid to that at which it was originally passed. This is a condition of urine which very often and very unnecessarily excites much anxiety on the part of patients, and only the persistence of which can be looked upon as a sign of what is called "the uric-acid diathesis." Mind, I mean strictly persistence, or at all events frequency of occurrence; for you or I, with no hereditary pre-disposition, may take a little more beer than usual, or an extra glass of champagne, or a glass or two of unaccustomed port, and find next morning a considerable quantity of this pinkish deposit, the urine looking almost like pea-soup, but not so thick, or like a mixture of rhubarb and magnesia; and when the vessel is tilted on one side a tidal mark, so to speak, is seen, showing the height at which the liquid stood; all this, as I said before, being redissolved by heat. But if, without any errors of diet, of which any but a very small allowance of alcoholic drink is only one, a patient habitually passes this kind of urine—if in time there is a frequent deposit of uric-acid, manifested by the presence of little crystals looking like particles of cayenne pepper at the bottom of the vessel—when this occurs rather early in life, say before forty, there is not much doubt that there is a strong tendency to produce uric acid, either inherited or acquired. For this tendency may to a certain extent be acquired, or a pre-existing habit

may be intensified ; but, as I have before said, it is almost always inherited.

We have followed the complaint up to the formation of cayenne-pepper-crystals. I now show you a specimen of urine quite cloudy with lithates, although you must be familiar with it in the wards, and how on heating the liquid it again becomes clear, and that in a short time, while we are talking, it again becomes cloudy on cooling. Let me once more remind you that this may happen with the most healthy individual ; and it is only the persistence of the symptom, without errors of diet, which should lead you to suspect a condition that requires treatment. Of the cayenne-pepper deposit I have some very good specimens here, which have been collected from patients who passed it habitually. These consist mainly of the transparent rhomboidal uric-acid crystals, which you know to be very beautiful objects under the microscope. They may be passed almost daily and habitually by some persons ; while others will do so only every few weeks, but then in large quantity, which usually produces a good deal of irritation. At such periods the patient may experience pains in the back and great discomfort, and be then said to have an attack of sand or gravel. These attacks may occur at varying intervals, and usually become more frequent or severe, unless the patient does something to prevent the formation. Afterwards he passes tiny calculi, popularly called "gravel," which seem to be rounded aggregations of the same crystals ; and these little bodies tend in time to become larger, sometimes as large as small peas, or even beans ; and they are still specimens of the same product—that is, of uric acid, associated more or less with some base, such as soda or ammonia.

Now let me recall for one moment what I said as to the relation of gout to this condition. I have frequently seen

these two complaints alternating, comparing one generation with another: gout appearing in the one, gravel in the second, and then gout in the third. But the same individual may also have alternating attacks of gout and gravel. I have seen a patient suffering for years from gout, which ceased for several months, when he developed for the first time a uric-acid stone. Lastly, the so-called "chalk-stone," which you have often seen investing the knuckles and disfiguring the hands of elderly people in advanced stages of gout, are composed of the same material—that is, of uric acid, usually as urate of soda. The identity of the two things, then, is unquestionable; they constitute two different series of phenomena, but both spring from one and the same root.

Now what is to be done for these cases? What mode of treatment will help to prevent the arrival of at least the advanced condition—namely, that of calculus too large to be voided by the patient? Generally speaking, I think we see such patients in a tolerably early stage, although this is by no means always the case. Some are much alarmed at a very early period, when the urine is only occasionally thick with urates. You will of course disabuse such patients of their false impressions, because numbers of persons mistake such thick urine for highly organized matter. I have known persons to become almost hypochondriac through not knowing that such deposits are of little consequence at first, and can be easily treated. But what are we to do for those who habitually pass the cayenne-pepper crystals of uric acid or small calculi? You will first seek the patient's antecedents, and learn all that he has to tell you of his habits, his diet, and his family history; and your mode of treatment will be determined accordingly. First of all, let me speak of the general principles upon which the treat-

ment should be conducted. A very simple rule—indeed, too simple, I think—is often adopted. When the urine has persistently and habitually thrown down acid deposits, the patient has generally been prescribed alkalies; if, on the contrary, he has had alkaline deposits, he has been treated with acids. That simple mode has too often formed the main portion of the treatment. In the former case he has soda or potash largely administered, or he will be told to drink so many glasses of Vichy water, which is mainly a strong solution of carbonate of soda, only it is a natural instead of an artificial one. Now it is quite true that with alkalies, provided enough be taken, these deposits will disappear; the uric acid will no longer be deposited; the urine will become less irritating; the annoying symptoms will be diminished or got rid of. And of course the patient is very much pleased with this new condition of clear urine and disappearance of all deposit. And you will say, "What more can be desired?" This: you have merely made his enemy disappear, but he is by no means rid of its presence; you have not checked the acid formation. The uric acid is there as much as ever; but the uric acid and the urates are soluble in alkali, and you have only made them invisible. You really have the same condition as that of the fabled ostrich, which is said to put its head in the bush when pursued by hunters, and, no longer seeing them, believes itself secure. Just such is the security of the patient with uric acid who trusts solely to alkalies or Vichy water. His surplus deposits have become imperceptible to *his* vision; nothing more. I do not say the alkalies have been absolutely unserviceable as regarding his constitutional state, but they will not improve it to any great extent; and when he leaves them off the acid shows itself again. Diuretics must be regarded in the same light. In those cases which are treated with diuretics, the

secretion of water is no doubt increased *quoad* the amount of solids, and the solids are thus dissolved. In both instances what you have chiefly done has been to stimulate the kidneys, already overworked, to do more. You have by no means cured the patient.

Now let us ask what is the real pathology of these cases, and then I think I shall be able to show you a more efficient remedy. The problem has presented itself to me with great force and frequency, because people, naturally fearing they may arrive at the stage of calculous formations, come for advice in the earliest stages, and with the strongest desire to avoid the advanced one of stone in the bladder. So far from sending them to Vichy or giving them alkalies, I believe they can be more effectually dealt with by a different mode of treatment. Let me premise, in broad and simple terms—as our time here, and, I may perhaps add, the extent of our knowledge, will not permit me to be more minute or exact in detail,—that the origin of what we call gouty symptoms, as well as of a superabundant uric-acid deposit in the urine, is due to defective assimilation on the part of organs associated with or forming the primæ viæ. I am quite aware that it is common in practice to speak somewhat knowingly of the liver, its actions and its states, although we have still a good deal to learn about all this. Some years ago we talked and acted as if we were thoroughly acquainted with the liver and its functions; but during the last fifteen or twenty years new light has been thrown upon the subject by Bernard, Pavy, and other workers in the same field, and we have learned that the more we inquired the less did we certainly know of its natural functions, still less of its action in disease. Thus, if one thing was more settled than another, at least since the time of Abernethy, it was that mercury had a specific influence on that organ ; but now we find that there

are grounds for believing that the action supposed has no existence at all. There were other things, indeed, which were vaunted to take the place of mercury, but no one ever thought of disputing the fact that you could augment at will the bile secretion by administering that famous drug. I am not here to say whether that is so or not, but it seems to have been proved that there are substantial reasons for doubting if our ancient faith in that dogma be tenable. In speaking, then, of the "defective action of the liver," or of "torpor of the liver," I merely use provisional terms, which most will easily understand as indicating more or less distinctly a certain set of symptoms. Let them be briefly described as mainly consisting of a constant, or almost constant, deficient excreting function by the bowels, sometimes, but by no means always, associated with impaired appetite and slow or uneasy digestion ; these latter being often absent if the diet is carefully selected, or if the patient lives in the open air and takes much exercise. On the other hand, considerable and multiform symptoms of disturbed digestion may be frequently present. I cannot positively state whether those phenomena are really due to inactivity of the organ in question ; practically, for us to day, this does not signify much, but the current terms are still convenient formularies until others can be substituted for describing the condition in question.

Now, at the bottom of this tendency to uric-acid production there often lies what is thus understood as inactivity of the liver ; and the true *rationale* of the unduly large formation of the urinary salts appears to be that, the liver or some allied organ not doing its duty as an excreting organ, the kidneys have more work thrown upon them. Thus the solid matters of the urine, or rather some of its ordinary con-

stituents, are augmented,—not all of them, for urea is not necessarily increased, but uric acid is largely produced, and is eliminated not only in solution but in crystalline forms. Uric acid is very insoluble in water; and although the quantity thrown out may be quite soluble at the natural temperature of the urine (100° Fahr.), when this diminishes to 80° , 50° , or 40° , the acid is deposited, and when the quantity becomes larger still, even the ordinary amount of fluid associated with it at a temperature of 100° will not suffice to dissolve the whole, and solid uric acid is deposited in some part of the urinary passages. This deposit may take place in the kidneys themselves, giving rise, if not thrown off, to the formation of calculus, at first renal, but sooner or later mostly becoming vesical. Now, if all this be so, the formation of uric-acid gravel is not by any means to be regarded as necessarily disease of the kidney; on the contrary, it is the result of an active and capable organ vicariously relieving some other organ which is torpid. The true remedy, therefore, is not to stimulate the kidneys, already overworked—not, to use a familiar simile, to spur that horse of the team which is already doing too much work, but you are to seek the cause in that other one of the team which is doing deficient work, and that is almost invariably the liver, in the sense already explained.

The treatment, then, which I advise you to pursue is to employ such agents as will stimulate the excretory action by the *primæ viæ* without depressing vital power. No doubt that a powerful agent for the purpose is mercury; and it is quite unquestionable that relief of the symptoms above alluded to is to be obtained in a remarkable manner by occasional small doses of that drug. For our purpose, however, it is neither so successful in action, nor

can it be considered so harmless, as another class of agents, I mean certain kinds of natural mineral waters. These I also regard as superior, in these maladies, to taraxacum, nitric acid, alkalies, and the other substitutes, as they have been termed, for mercurial remedies, in promoting the function of the liver. The mineral waters which I refer to belong to a group of springs all containing sulphate of soda, and some of them sulphate of magnesia also, in solution. In studying these waters, I wish you to look with me at the composition of them, and at the same time to dismiss from your minds entirely those views of medicinal doses which you have acquired in the dispensary, and which necessarily belong to it, since small quantities of drugs, as they exist in mineral waters, will act more freely than will those quantities combined after the ordinary pharmaceutical method. You ask me for a demonstration, and I am quite ready to give it you. At the same time, let me caution you against regarding the small doses of mineral waters as having any affinity, either in the matter of quantity or by manner of administration, with what is understood as homeopathic doses. Thus, for example, you know that you may give A an ounce of salts, or B half an ounce, and you purge them; but you may obtain the same effect with one-fifth of those quantities if you give it as prepared in nature's laboratory in the form of mineral water. It is a curious fact, which I give as an ultimate one, and without speculating here on the cause of the difference. As a proof of the superior force of the saline combinations found in natural springs, I may refer you to the following experiment. If you will reduce by careful evaporation, as I have done, such mineral waters to their pharmaceutical condition of crystallized salts, you will find them possessing little if any more power than similar salts

as obtained by the ordinary processes, and met with in every chemist's shop. They no longer do their work on the same terms as when administered in the original water before they were separated by evaporation. You will therefore readily understand how essential to our end it is to employ the natural mineral waters ; since what are called "artificial waters," however admirably prepared, are simply pharmaceutical products, and are destitute of the very quality which distinguishes the remedies they are designed to imitate.

Here is a table of the waters which I refer to, with a comparative synopsis of their distinguishing saline contents, representing the number of grains (without chloride of sodium and other less active agents) in an English pint. Below these I add two well-known alkaline waters.

—	Sulphate of Soda.	Sulphate of Magnesia.	Carbonate of Soda.	Other Ingredients.
<i>Saline :</i>				
Püllna	154 grs.	116 grs.	—	
Friedrichshalle ...	58 „	49 „	—	
Marienbad (Kreuz) ...	48 „	—	9 grs.	{ Little iron.
Carlsbad (Sprudel) ...	25 „	—	13 „	
Franzensbad ...	30 „	—	6 „	{ Little iron.
<i>Alkaline :</i>				
Vichy (Celestins) about }	3 „	—	47 „	{ Little iron.
Vals (Magdeleine) about }	—	—	65 „	{ Little iron.

The most powerful of this group is that of Püllna, which

contains 154 grains, or nearly $2\frac{1}{2}$ drachms, of sulphate of soda to the English pint, and nearly 2 drachms, of sulphate of magnesia. Those quantities would give a tolerably efficient purge to anybody. But you must not give a pint of Püllna; 5 ounces would be a full dose. I do not like Püllna generally for our purpose, because it purges too freely, often gripes, and is very nauseous. Half a drachm of sulphate of soda and half a drachm of sulphate of magnesia in this form is too much for many people. I therefore recommend Friedrichshalle, which contains not a drachm of sulphate of soda in a pint, and little more than three-quarters of a drachm of sulphate of magnesia. Nevertheless, you would not think of giving a pint; eight or nine ounces make an efficient purge; for many persons six or seven suffice. I think I may say that seven ounces is an ordinary average dose, and it should be warmed and diluted too, adding, say a third or a half of its bulk of hot plain water. If you take seven ounces of Friedrichshalle water an hour before breakfast, and soon after a cup of hot tea or coffee, you will have a full, free action of the bowels; perhaps two. That, you see, would be about twenty-five grains of sulphate of soda and twenty grains of sulphate of magnesia, which, taken in any combination you like out of a druggist's drawer, would have no appreciable action; you might be a little uncomfortable perhaps, but there would be no action of the bowels. To repeat what I have said: if you evaporate a quantity of Friedrichshalle water in a warm water bath so as to avoid decomposition of the salt, or even loss of the water of crystallization, and so obtain as perfect a product as a chemist can produce, and administer four times the amount of this salt as that which exists in a dose of the natural water, you would still not have such efficient or such certain results

as the small quantity in the natural water will give you. So that there is something, which I do not pretend to explain, and certainly shall not speculate about here, which distinguishes the action of mineral waters from the action of salts which are produced pharmaceutically.

The next water on my list is Marienbad, which contains no sulphate of magnesia, forty-eight grains of sulphate of soda in the pint, with nine grains of carbonate of soda, and a small quantity of iron. With these constituents, there is enough free carbonic acid to make it an agreeable and slightly sparkling draught. Rather more than half a pint produces for most persons an easy motion. If this water is exposed to the air for a day or two, there will be an obvious brown deposit of the iron, and it may be regarded as slightly ferruginous, though that is a secondary character. The next is Carlsbad, with its many springs, all of which contain about twenty grains of sulphate of soda and thirteen of carbonate of soda in the pint. Then we come to Franzensbad, which contains thirty grains of sulphate of soda, six of carbonate, and a little iron, which Carlsbad does not. That closes this group of springs.

But now I shall just point out the distinctive characters of the alkaline waters which are so popular in this country. First, Vichy, which contains only three grains of sulphate of soda, but nearly fifty grains of carbonate of soda, in the pint —a powerful solution. Then we come to Vals, which is also from the volcanic district of France, some of the springs of which contain upwards of sixty grains of carbonate of soda, and nothing else worth mentioning. These two waters are extremely famous, and are much resorted to against gout and gravel. Under their use the uric-acid deposits disappear —that is, they are dissolved by the alkali. Inasmuch also

as this appears to have some beneficial action on the liver, a certain degree of permanent benefit is perhaps also attained. Thus such patients are often better for a time after a visit to Vichy; but, as a rule, are not permanently benefited. I am satisfied, after observation on the spot, and on the effect of the waters here, that they only temporarily mitigate the complaint, and do not cure it. Now, the principle upon which the waters of Friedrichshalle and Carlsbad are beneficial is, that they produce activity in all the digestive functions, and thus waste matters which have been hitherto thrown out as uric acid by the kidney are eliminated in some other form. And thus it is that, if it be necessary to send these patients abroad, I prefer very much Carlsbad to Vichy, provided always that the subject of a Carlsbad course must not have become too weak, as for a time it makes a demand on the strength not well supported by a feeble person. Generally, however, this is not at all the condition of those who are passing uric-acid gravel. Happily, also, for most people our purpose can be attained as well at home. I believe that a short course of Friedrichshalle water first, followed by that of Carlsbad, or by a combination of the two, produces the best results in these cases. This method has, at all events, been more successful with me than any other. Such a course should be continued, according to circumstances, for six or eight weeks.

A few words upon the way in which you should give them. If you have a patient coming to you whose digestion is not good, complaining of foul tongue, with deranged stomach and loss of appetite, it is sometimes, not always, desirable to give first a single dose, no more, say three or four grains, of blue pill at night, and the next morning eight or ten ounces of Friedrichshalle water, so as to ensure a free action

of the bowels. Then commence with Friedrichshalle combined with hot water, one dose every morning an hour before breakfast, diminishing a little the quantity of mineral water, every day or every few days. One of the characteristics of this water is that the longer it is taken the smaller is the quantity necessary to effect the purpose. If, for example, seven or eight ounces taken in the morning, say with five ounces of hot water, produce one active movement of the bowels immediately after breakfast, the next morning six or seven ounces will do the same, and the morning after probably five or six ounces; and it is very likely that at the end of three weeks the patient will from four ounces experience the same effect produced originally by seven or eight. But after you have given it thus for one, two, or three weeks, according to the nature of the case and the results, you should combine it with Carlsbad, say three or four ounces of the former and five or six of the latter, with three or four of hot water every morning. When Friedrichshalle is given alone, and also when it is mixed with Carlsbad, 20 or 30 per cent. of hot water should be added, that it may resemble somewhat the natural condition of the spring. Friedrichshalle is naturally hot, and is evaporated on the spot to a small extent, being regulated and rendered uniform by stopping the process when the water reaches a certain specific gravity. After giving this combination of the two waters for two or three weeks, six, seven, or eight ounces of Carlsbad may be taken alone for another fortnight perhaps. Carlsbad, which at the spring is too hot to drink until cooled, should, when taken alone and unmixed, be raised in temperature to 90° or 100°, by placing the tumbler containing it in a vessel of hot water for a few minutes. The quantities given are considerably less than those administered at the

spa itself, where a patient's stay is necessarily limited as to time. I am quite satisfied that the smaller quantity here recommended, and employed for six to nine weeks, instead of the usual three weeks of a foreign course, is better for a majority of the patients we have to deal with. The same quantity of water given there in twenty-one days, producing often notable loss of weight and power, will, if given here in fifty or sixty days, attain the object as certainly and more safely. I by no means dispute that there are other cases which may be benefited by the more heroic plan adopted on the spot. I have largely and systematically employed these agents now for seven or eight years, modifying the quantity and the mode as experience has indicated, and the course thus briefly described is the result of it. The course may be repeated with advantage, if necessary, for most patients after an interval of three or four months. Meantime, as an occasional aperient and a corrector of digestion for these patients, I know nothing at all equal to Friedrichshalle. It leaves the patient as a rule less constipated after discontinuing it than he was before; and, as already said, may be taken habitually without lowering the system. I have known patients continuing its daily use for three or four years, but I do not advise this course unless in exceptional cases. Nevertheless, I know a gentleman, nearly eighty years old, who has taken it for five years regularly, a wine-glass every morning, and the effect has been for him most admirable. Suffering much formerly from an obstinate constipation, he enjoys perfect regularity and excellent health. Let me say here that what is called "Carlsbad salt" is often used for the same purpose, and is taken also in the belief that it represents Carlsbad water. This it does not do, since it consists almost entirely of sulphate of soda taken from the water, and has the same

and no more virtue than that salt when obtained from any other source. No doubt that the sulphate of soda, known also as "Glauber's salt," is one of the most admirable medicines we possess, and deserves to be more popular than it is. I constantly order it, with or without a small addition of sulphate of magnesia, for the out-patients, as the best substitute within my reach for the mineral waters in question.

In the few minutes which remain I will advert briefly to the subject of diet, certain restrictions in which are extremely important. It used to be said that when uric acid is largely deposited the nitrogenous elements of the food should be considerably diminished. I do not find in practice that a strict application of this rule is advantageous. On the contrary, diminution of the deposit is more certainly attained by a course which is almost the opposite of that. There are three classes of aliments which must be permitted to the patient very sparingly, in order to attain the end in view—viz., alcohol, saccharine and fatty matters. First, alcohol: any fermented liquor permitted as an article of diet should be selected in its more diluted and in its most pure form. Believing that form in which it is found existing in natural wines to be usually the best, I would advise a light sound Bordeaux or a Rhine wine of similar quality, the former perhaps agreeing better with most persons here. You will forbid champagne, as for the most part imperfectly constituted, and always bad if containing much liqueur. The stronger wines, as sherry and port, are mostly unsuitable, and strong beer is to be absolutely forbidden. Solutions of pure spirit and water are exceptionally desirable for some few persons with weak digestion. Secondly, sugar in all its forms: at every meal and wherever met with, forbid it altogether. Thirdly, let fatty matters, butter, cream, and the fat of meat,

whether simply cooked or in combination to form pastry, be taken very sparingly. I cannot enlarge on the theory on which this advice is given. Suffice it to say that abstinence from the substances named probably lightens considerably the work of the liver, and so lessens the vicarious labour of the kidneys in accordance with the views already propounded. Let me just advert, however, to the dietetic system at Carlsbad. In recognition of some such principle there, no doubt, the use of sugar and of butter is absolutely forbidden during a Carlsbad course; and were you patients there, your purveyor would not supply you with the forbidden food, however much you might demand it. I can only say, as the result of observation, that this system, much more than the elimination of meat from the dietary, will reduce the uric acid deposit. If you will cut off a portion of alcoholic stimulant when necessary, and it mostly is so, while in some cases you may certainly with advantage forbid it altogether; if you will forbid everything that contains sugar, and diminish considerably all fatty matter—giving nitrogenous food, in fact, and diminishing greatly hydrocarbons—you will generally accomplish more than by the contrary method. One class of food, neglected by most people, is particularly to be recommended here; I mean fresh green vegetables, for the most part cooked, of all descriptions. A sufficient quantity should be taken, at two meals in the day, to form an important portion of the daily nutriment. Apples also, baked or stewed, with very little sugar, may be taken also, but not fruits containing much sugar—as grapes, pears, and plums. With many, a light salad will agree, and if so, is quite admissible. Besides attending thus to diet, you will of course direct that the patient takes daily a fair amount of exercise in the open air, and that he protects his skin and encourages the performance of its

functions by habitual ablutions and sufficient clothing. These points I can only name; but they are essential concomitants to the rest.

Well, then, it is this system of diet and regimen, and the occasional systematic employment of the mineral waters named, which mainly constitute the treatment I strongly advise for the purpose of checking calculous disease in its early stages, and so to prevent the formation of stone in the bladder in that considerable majority of cases which are due to uric-acid formation and its consequences.

LECTURE XII.

CYSTITIS AND PROSTATITIS.

GENTLEMEN,—It is quite possible that you may see little or nothing, even during a considerable experience of general practice, of those diseases which have occupied our last three lectures. Some men never meet with a case of stone in the bladder during a lifetime, and of those who do, very few undertake themselves to treat it. But the very reverse of this is the case with the subject which comes before us to-day. Fraught with much less of what one calls "interest" for an operator, its attractiveness to the student must be found in the fact that cystitis, or inflammation of the bladder, is the commonest affection of that organ, that it is certain to occur in his practice, and probably not unfrequently. For, whatever else you may have in connection with the urinary organs, you are certain to have cystitis. If a man has stricture severely, or stone, or disease of the kidney, or disease of the prostate, sooner or later he has cystitis, either acute, or chronic, the symptoms of which are often the most prominent features in all these diseases.

Then I beg you to remember that cystitis has almost always some ascertainable cause, and that it very rarely indeed appears in what is called an idiopathic form. You

will find that there is, or has been, gonorrhœa, or stricture, or disease of the prostate, or retained urine, or urine altered in character, or some other such cause ; and if you have readily come to the conclusion that any case before you is "idiopathic," suspect that you have not discovered the cause, for the probability is that you have not searched deeply or carefully enough. Here and there the true pathology of such a case will elude our best efforts. Possibly you may be forced to attribute it to a gouty diathesis. A very refuge in time of trouble for practitioners of feeble diagnostic power is gout, particularly " suppressed gout;" therefore beware of it. And while, I think, it must be admitted that inflammations, both of the urethra and of the bladder, may be sometimes mere local developments of the ubiquitous influence so named, I am sure that this cause is of exceedingly rare occurrence. Certain irritant poisons also—amongst which cantharides is the most prominent and likely to be met with—occasion cystitis, which I have seen severe in character, and lasting from ten to twenty hours, as the effect of an ordinary blister.*

First, then, I shall call your attention to acute, and secondly, and chiefly, to chronic cystitis.

Acute cystitis appears in two very distinct forms: one which is severe and dangerous, the other which is much less so.

The dangerous form is that which accompanies the most severe lesions to which the bladder is exposed. The first

* I think it may be useful to suggest that this possibly never occurs, except where the blister is applied to a cutaneous surface which has previously been broken, or from which the epithelium has been previously removed. The only instance in which I have seen it—referred to in the text —was one in which the blister was applied over a knee-joint, whose cutaneous surface had been just strongly acted on by iodine.

breaking up of a large and hard stone into large fragments, either spontaneously or by the lithotrite, has sometimes caused it; violence to the bladder in lithotomy and the like are causes. Rigors, bloody urine, extreme pain and irritability of the organ, announce the fact, and the patient succumbs in a few days. At the autopsy you will see the lining membrane of a dark crimson hue throughout, or nearly so, and often spots where it appears to be sloughing and exposing the muscular fibres.

The less severe form of acute cystitis is common enough. There is reason to believe that the neck of the bladder is the part mainly affected in these cases; and the reason for this is that, what we call cystitis is often really inflammation of the prostate mainly, or of the urethra passing through it, entirely so perhaps at first, and that the mucous membrane of the bladder is affected by extension. And as, anatomically, I don't know how we can make an accurate separation between these two organs, it is often legitimate to speak of this affection as "inflammation of the neck of the bladder." After gonorrhœa, or from external cold and damp, and in connection with many circumstances of no apparent importance, a man becomes the subject of frequent and painful micturition, and has a sense of aching or gnawing pain above the pubes; while the urine is cloudy from an increase of the natural mucus of the bladder (not the tenacious viscid secretion, mind, which I shall speak of under the head of Chronic Cystitis); and there is usually some constitutional sympathy with the local disturbance, evinced by loss of appetite and general feverishness.

The treatment consists in mild laxatives and diuretics, demulcents, hot hip-baths, local poultices, and anodynes, if

necessary. Besides these, the use of certain infusions, and decoctions, of which I shall speak hereafter.

But that which most requires our attention is the chronic form of the disease. It is that which requires the most care and judgment, and for which we have most to do in the shape of treatment. Chronic cystitis also appears in two distinct forms. In the simpler, there is little else than some increase of the natural mucus from the bladder mixed with the urine. Just as when you have a common cold, there is inflammation of the mucous membrane of the nose and towards the frontal sinuses, with increase of its secretion, so the mucous membrane of the bladder adds mucus to the urine ; and the inflamed mucous membrane, being more sensitive, will not permit itself to be much extended by accumulating urine, but forces the bladder to expel it as soon as possible : hence the frequency of making water. But, besides this, there is another form, in which the mucus has a distinct character. It is often spoken of, and not very wisely, as "catarrh of the bladder"—another example of an unfortunate term leading to error in practice. The mucus is very tenacious, and when you empty a vessel containing the urine of such a patient, it runs off first, and then a quantity of ropy mucus follows in a mass. You may see a pint or more of this material passed in the course of the day, and it acquires the viscid character on standing. Some patients pass it for months together, and such are said, especially abroad, to have "catarrh of the bladder," which, and there especially, is said to be a very dangerous and a very incurable disease. Indeed, to tell a foreigner that he has "catarrh of the bladder," is to alarm the poor man exceedingly. Now, this is because it is regarded as an essential disease, instead of a mere symptom ;

for of course it is no more a disease than dropsy is. Formerly, you know, we talked of dropsy as a very formidable malady, and it still is so to the popular mind; but no intelligent student would now, I suppose, be satisfied to think of it except as a symptom. He would say: "Is it due to cardiac, to renal, or to hepatic disease? What is the cause of it?" Precisely so it is with this "catarrh of the bladder." You inquire what is the cause of it, and you find in nine cases out of ten there is a very distinct cause, and mostly a removable one. You are not to be stopped by this name, and ask me what is good for catarrh; but you must carry further the diagnosis, and ascertain the precise condition which has occasioned it. And the most common cause is one too often overlooked, as I shall repeat—viz., inability of the bladder, either from atony of its coats or prostatic obstruction, to empty its cavity; yet this peculiar mucopurulent secretion does by no means necessarily occur in these circumstances, and I cannot tell you at present how it happens that in some cases, otherwise apparently similar, of retained urine, it contains only some light flocculent mucus, and that in others there shall be a very large quantity of this tenacious matter.

With regard to the treatment, the first thing is to take care that the bladder is emptied by a catheter once, twice, or three times a day, in the easiest manner possible, of which I treated in the fifth lecture. And this is necessary because decomposing urine is a source of great irritation to the mucous membrane. The urea contained in the secretion which enters by the ureters in a healthy state is soon decomposed into carbonate of ammonia, and the ammoniacal salt is an acrid and irritating substance. You explain to your patient that his bladder, not having been emptied for

many months perhaps, has acquired somewhat the condition which a badly-washed utensil would have done in like circumstances—a useful and sufficiently accurate illustration for the lay understanding,—and he will appreciate it when he finds, as he probably will, that the mucus diminishes considerably after a few days of this treatment. But suppose it does not do so, or does so but slightly, what then? I will tell you what sometimes happens, and I am not sure that the fact I am about to ask your attention to has been observed or recorded. It is this: *you cannot completely empty every bladder with the catheter.* When the prostate is irregular in shape, and throws out protuberances into the bladder, there are sinuses or spaces between them, which retain one, two, or even more drachms of urine. Again, there are not unfrequently numerous small sacculi in the coats of the bladder which act in the same way. When obstruction at the neck has existed some time, the daily straining,—although not considerable—necessary to expel the urine, produces hypertrophy of the muscular bands which form that coat of the bladder. Now, you know hydraulic pressure is equal in every direction, and in course of time the expulsive act, more powerful than in health, gradually forces the mucous lining between the interlacing muscular bands, and little pouches result. In these it is not uncommon for calculi to secrete themselves, and thus in time encysted calculus is formed. In any case, however, those pouches form receptacles for urine, which becomes stale, and irritating, in consequence, and not at all unfrequently they attain a large size; such a one is depicted at Fig. 25. Now, the mere withdrawal of the urine by catheter by no means empties the reservoir in these circumstances, and enough of noxious fluid is left in these pouches or

sacculi to maintain the unhealthy condition of the lining membrane. What you have to do is, to wash out the bladder at least once a day with a little warm water before you remove the catheter. I am very particular indeed as to the manner of doing this. Washing out the bladder may be a very valuable mode of treatment, or a mere contrivance for seriously irritating that organ, according to the mode in which it is performed. A common mode—indeed that which I always saw employed some years ago—was to attach to the catheter (which was often of silver, and it is unnecessary to repeat my views about that) a large metal syringe, and to throw in with considerable force six or eight



FIG 25.—Section of bladder and prostate. A large sac of the former, marked b, produced by long-standing unrelieved retention of urine; a bougie lies in the small opening by which it communicated with the bladder.

ounces of water. I wish you to cherish a wholesome horror

of that proceeding, and in no case can it be necessary. A healthy bladder, and much more, a tender one, can only be disturbed and pained by such a process. This sensitive organ is only accustomed to be distended gradually by the continued percolation into it of urine from the kidneys. Let your washing-out at least conform in some respect to that process. Never, under any circumstances, throw in more than two ounces: and even this quantity, for efficient washing, is better avoided. Proceed then as follows: You have a flexible catheter in the bladder; have ready a four-ounce india-rubber bottle—with a brass nozzle and stopcock, the nozzle long and tapering, so as to fit a catheter of any size between Nos. 5 and 10—filled with warm water, say at 100° Fahr. Attach the nozzle gently to the catheter, and throw in slowly a fourth of the contents; let that run out, and it will be thick and dirty, no doubt; then inject another fourth which will be less so; again another, which will return clearer than the preceding; and the fourth portion will probably come away nearly clear. Now, these four separate washings of an ounce each will have been really more efficient than two washings of four ounces each; and you will, in obedience to my never-failing injunction, have reduced the amount of instrumental irritation to a minimum. Ten to one but the patient will regard your performance as soothing to his feelings. There are other methods of effecting the object, but this is the *principle* I want you to understand; and the mode of carrying it out which I have described is one of the simplest.

What if this washing-out has not accomplished all we wish? We may then, and often with great advantage, try medicated injections. Perhaps the best mild astringent, when the urine is alkaline and depositing phosphates, is the

acetate of lead, in the proportion of one grain to four ounces of warm water, not stronger ; to be used once a day. After this comes the dilute nitric acid ; one or two minims to the ounce of water. Then you may try nitrate of silver in small quantity—certainly not more than one grain to four ounces to begin with, going up to about half a grain, or one grain at most, to the ounce. You may also use, especially where the urine is offensive, carbolic acid ; one or two minims to four ounces is quite strong enough. Then there is a soothing injection well worth your remembering—viz., borate of soda and glycerine. It may be used where there is no great occasion for an astringent, or it may be combined with one. The value of this for sore mouth suggested to me its use for an irritable bladder, and experience has confirmed my expectation. Here is my formula : Two ounces of glycerine will hold in solution one ounce of borate of soda ; to this add two ounces of water. Let this be the solution, of which you add two or three teaspoonfuls to four ounces of warm water. I arrange all these solutions for four ounces, because the four-ounce india-rubber injecting bottle already described is a convenient and portable instrument. Somewhat recently much has been said of the value of a solution of quinine as an injection, from one to two grains to the ounce of water, with a drop or two of acetic acid to insure solution, in presence of mucous and offensive urine. I have tried it frequently, and may, perhaps, have derived some advantage from it.

In circumstances of great pain, you may inject anodynes into the bladder if you please ; but they are of little value. And you need not be afraid of the quantity ; for the mucous membrane of the bladder appears to have no absorbing power, unlike the neighbouring tissue which lines the

rectum.* And there, indeed, is your place for action, if spasm and pain greatly disturb the patient; a suppository of cocoa-nut butter, containing from half a grain to a grain of morphia, is often of the greatest service. Counter-irritants play a small part among our remedies; perhaps the best and safest is a hot linseed poultice, well sprinkled with strong flour of mustard, above the pubes. I cannot say much for croton oil, nitrate of silver, &c., there. Hot fomentations, in the form of bran or sand-bags, hot flannels, &c., alleviate pain materially; so also hot hip-baths and the hot bidet.

Then there is a host of infusions and decoctions reputed to exercise a beneficial influence in cystitis. I will name some of them in what I think to be about the order of their value for the cases one commonly meets with: Buchu, Triticum repens, Alchimella arvensis, Pareira brava, and Uva ursi. Now, for the doses of these, your conventional tablespoonful is a miserably inefficient measure. Of the first, fourth, and fifth, give half a pint daily; of the second and third, a pint, that is of their infusions or decoctions, as the case may be.

The underground stem of the *Triticum ripens*, or the

* Some one thought proper to question, in one of the journals, the accuracy of this statement relative to the effect of narcotic injections into the bladder, and even to caution my readers against relying on me too implicitly. It might have seemed otherwise almost unnecessary to say, that this statement was the result of very numerous experiments and observations; and its object was of course to show that such injections were of small service, and, therefore, not to be recommended. My only reply to the critic was to inject *four drachms* of *Liq. opii sed.* into the bladder of a patient with chronic cystitis, in one of my wards in Univ. Coll. Hospital, on four separate occasions, in presence of the students, who verified for themselves the absence of any sign of the presence of opium in the system. Subsequently, a dose (*by mouth*) of twenty minimis, produced them all most notably.

common couch grass, was introduced some years ago by myself. Of this I will only say that it maintains its credit, and is undoubtedly very useful in many cases. For use, boil slowly from two to four ounces in a quart of water until reduced to a pint; the strained liquor to be taken by the patient in four doses in the twenty-four hours. It was a favourite remedy in the old herbals; and it formed the staple medicine against what was called "strangury," which, a few centuries ago, meant everything like pain or difficulty in making water, no matter what the cause; for the art of diagnosis then was in its earliest infancy. The "Parsley pier't" (derived from "percer la pierre," and not a parsley or umbelliferous plant at all), or *Alchimella arvensis*, has proved in my experience an admirable remedy in obscure cases. Use it as an infusion: one ounce to the pint. Besides these there are the resins, which have a certain amount of influence upon the mucous membrane of the bladder; such, for instance, as copaiba, sandalwood oil, Venice turpentine, &c. You should not, however, give the dose which you would give in gonorrhœa. Five minims of copaiba, three or four times a day, in mucilage, is sometimes useful. I may say the same of the oil of cubebs.

One word about alkalies. As a rule, no doubt, alkalies, in neutralizing highly acid urine, help to control chronic cystitis; and I like the liquor potassæ, as well as the bicarbonates, tartrates, and citrates, which appear to have more diuretic action, and to increase the quantity of urine, when you would rather avoid this action and lessen the frequency of micturition. The old combination of liquor potassæ and henbane, affirmed to be a union of incompatibles, nevertheless seems to me about the most valuable form in practice. It may for ought I know be sufficiently correct that both

henbane and belladonna are deprived of their specific activities when mixed with liquor potassæ. Chemically, perhaps, that is so. But I am perfectly satisfied that this combination materially controls painful and frequent micturition in the complaint we are considering. Hence I have of late gone back to it, and for the reason stated:

Now as to acids. Remember that these are by no means the complement of alkalies in relation to the urine. Beware of the popular notion that it is possible to produce an acid reaction on urine by giving mineral acids by the mouth. By giving alkalies, you can make the urine neutral or alkaline to any extent you please, but you cannot do the converse with these acids. Yet I constantly hear it said, "The patient's urine is very alkaline; had we not better order acids?" My reply is, "By all means; give an ounce or two daily, if you like, but it will not change the reaction of the urine." I have given these quantities, greatly diluted, of course, without the slightest effect on alkaline urine. No doubt mineral acids are useful in giving tone, and so do good; but don't prescribe them with the view of directly acting on the urine. The acids that do act on the urine are benzoic acid and citric acid, but you have to give so much of these that I do not know whether the remedy is not mostly worse than the disease. The benzoic acid, having some balsamic character, may be useful in some cases of chronic cystitis. The best way to give it is in pills, as it is not soluble in water. Three or four grains, with one drop of glycerine, is a good form; and you must give as many as ten or twelve pills a day if you wish to do any good. At all events, it is useless to give less than six; that would be twenty-four grains in the day. Lemon-juice has also an acid influence on the urine, and if it agrees with the stomach, may

be taken in large quantity. But here is the important fact for you to remember: Surplus of acid in the urine is a constitutional error, and it enters the urinary passages at the kidney. It requires constitutional treatment, of the digestive rather than of the excretory organs, and mere alkaline treatment does but mask the acid, does not cure it. You have to remodel the patient's habits, control his diet, and take care that his liver and bowels act healthily and freely. On the other hand, persistent alkali in the urine is, in nineteen times out of twenty, a *local* formation in the bladder. If you take pains to get a specimen of the urine direct from the kidney before its alteration in the bladder, you will find it acid enough. Such alkaline urine requires local treatment, as by catheter and injecting-bottle, and not physic. Now and then you meet with neutral or alkaline urine, milky-looking, with amorphous phosphates, as a constitutional condition; but this is rare as compared with the cases I am now describing.

I shall close this lecture with some brief remarks on acute and chronic prostatitis.

Acute prostatitis occurs in different degrees of severity, and often comes first before the practitioner's notice, when it causes retention of urine by obstructing the neck of the bladder. How this emergency is to be met I have described at some length in the sixth lecture. The organ is often considerably swollen and very tender, and the inflammation may give rise to abscess in the substance of the gland, or adjacent to it; and the matter may burst either into the urethra, its most common course, or into the rectum.

Chronic inflammation of the urethra passing through the prostate, and more or less affecting the prostate itself, is a condition less generally known or recognized. Nevertheless,

it is a common and important affection. We see it frequently, not always, as the result of obstinate gonorrhœa. I have already referred to it as the cause of symptoms resembling, more than any other malady, those of calculus in the bladder when mild in degree. Thus a patient of twenty or thirty years of age tells you that the following symptoms have rather gradually appeared:—Undue frequency of micturition; pain following the act, and felt in the end of the penis; occasionally a little blood seen with the last few drops of urine, which may be a little cloudy with muco-purulent deposit; a sense of heat and weight in the perineum and rectum; there is, perhaps, also some gleety discharge in the urethra. All these conditions are aggravated by exercise. You see he gives you a complete sketch of the symptoms of calculus; and how are you to distinguish them? By the history and by sounding. Thus, there is no history of the descent of calculus from the kidney, nor of gravel previously passed. But there is the fact of a chronic gonorrhœa resisting, perhaps, months of treatment. And if the patient shows no improvement, you must not decline to sound him. You do so, and find nothing, but that the prostatic urethra was very sensitive, and you make him worse, perhaps, for a day or two.

What is to be done? First and foremost, as a rule, abjure all instruments, which, in most cases, can only do mischief. Treat it as you would a chronic inflammation of the ear or eye—*i.e.*, blister an adjacent surface; make a small blister every four or five days on either side of the raphé of the perineum, by applying with a brush the Liq. epispast. of the Pharmacopœia, not so freely as to distress him or prevent locomotion, and keep it up for four or six weeks. I have found the best results from this method,

combined with a tonic medicine and regimen, and you will find the patient himself gladly exchanging the dull weary aching in the perineum for the smart of the blister, and cheerfully noticing how the former gradually subsides under the influence of the latter. In exceptional cases, where chronic gleet is a prominent symptom, the application of a solution of nitrate of silver, not more than five or ten grains to the ounce of water, to the prostatic urethra, may be very serviceable.

I shall in my next lecture proceed with diseases of the bladder.

LECTURE XIII.

DISEASES OF THE BLADDER: PARALYSIS; ATONY; JUVENILE
INCONTINENCE; TUMOURS.

GENTLEMEN,—On two occasions recently a patient has been sent to my ward affirmed to have "paralysis of the bladder;" such, at least, is the statement that accompanied them here. On examining one of them we found a not unhealthy-looking elderly labouring man, from whom, by much questioning, we elicited the following facts: That he was nearly sixty years of age; that he has passed his water much too frequently for four or five years; that he was much disturbed at night to do it, although lately it has come away without his knowledge during sleep; that when he makes an effort at work the same thing often happens; that the stream is weak, falling almost perpendicularly; that he has "no particular pains," but is not so strong as formerly, having become much weaker of late; and that for the last few months the urine has been cloudy, and has had a disagreeable smell. With all this his ordinary functions had been fairly performed, and he had followed his daily labour until three weeks ago.

The man was desired to unfasten his dress; as he did so you remarked a urinous odour, and that certain cloths, which

did duty for an india-rubber receptacle,—a luxury beyond the means of our patient—were wet with the secretion. Two conditions only could cause this unhappy state of things : either the bladder was incapable of performing its office as a reservoir, and permitted the urine to escape as fast as it entered from the ureters, or it was unable to expel its contents, so that it was over-distended by them, the surplus oozing out, or being forced out, in the manner described.

Now a glance of the eye might have nearly sufficed to settle this question. I pointed out a marked protuberance above the pubic symphysis ; and after placing the patient on his back, the dulness by percussion corresponding with that spot, and the clear bowel-note all round, diminished the doubt that this was a collection of fluid, if any such doubt yet existed. Still this was not quite all that it was necessary to know ; it was just possible that the swelling might be a solid tumour of the bladder, occupying its proper space and much more, and so destroying its function as a reservoir. To the hand, however, the protuberance was clearly made up of fluid ; but even this is short of absolute demonstration, for the most practised hand has been known sometimes to “lose its cunning,” or to have found a too deceptive quality in the object handled. Finally, you saw that a well-curved gum catheter glided into the bladder, and upwards of 40 ozs. of somewhat stale urine flowed off. I then examined the prostate, and found no very obvious enlargement.

Now, was this a case of “paralysis of the bladder ?” Certainly not. His history showed that he had had no seizure of any kind, and I beg you to understand that without some change in a nervous centre there is no paralysis of the bladder. Recall, if you please, what I said in my fifth

lecture on this subject. This term is applied, or rather misapplied, every day to such cases as the one before us, and with the result not merely of masking the true pathological state, which ought always, if possible, to be indicated by a nosological term, but of misleading the inquirer, since it indicates a condition which by no means exists.

What, then, is the defect or disease occasioning the symptoms in this case? Probably, atony of the bladder. I will speak presently with more precision. The bladder fails to expel its contents in the two following conditions: either a growth from the prostate, by no means necessarily large, obstructs the neck, so that the natural power of a healthy bladder—which may, moreover, have been reinforced for the difficulty, by hypertrophy of its fibres rendering it stronger—cannot propel the urine by or over the obstruction into the urethra; or, these muscular fibres of the bladder are so enfeebled, or even atrophied, that their propelling power is lost or greatly diminished, and the organ becomes a thin flaccid bag, and can exert no expulsive force upon its contents.

The two conditions sometimes coincide. We may have hypertrophy of the bladder following obstruction from stricture of the urethra. On the other hand, with obstruction from the prostate, the vesical coats sometimes extend and become thin. But atony may be produced without any disease of the prostate, and then mainly from the subject of it having been placed in circumstances which obliged him to retain his urine for a too considerable period, so that the bladder became over-distended, and has failed subsequently to regain its tone. Unfortunately, a single error of this kind will sometimes produce an atony, which becomes irremediable if discovered too late.

Now, on further questioning our patient, we did not find that he could recall any such instance, nor that he had ever formed the habit of permitting such over-distension. Neither did the affection occur suddenly; on the contrary, the symptoms appeared gradually. What is still more significant is, that they occurred just at that time of life when prostatic hypertrophy commences, if it appears at all. Still, the prostate was not obviously large on examination by the bowel. We arrive, then, at the following conclusions:—That this man has some enlargement of the prostate, which, though not obvious in the rectum, consists in a small nipple-like projection of the median portion, occluding the neck of the bladder, and that, from the size of the bladder, as just now demonstrated by percussion and by its contents, its walls are thin, and have lost their contractile power; in other words, are in a condition of atony.

I think there is no escape from these conclusions, and I beg that you will not only never permit yourselves to allude to this condition as "paralysis," but that you will protest against so loose and improper a use of the term when you hear it thus misapplied by others. Now, true paralysis of the bladder occurs from injury to the spine, and also as one of that large group of symptoms which result from disease in the cerebral or cerebro-spinal centres. You find it associated with slightly unsteady gait, with impaired articulation, or with some of the slighter signs of such central mischief, as well as with those which are most obvious; and I have even found it persisting after all other signs have nearly—I cannot say quite—disappeared.

In all cases, as in that of this patient in the ward, it is essential to empty the bladder by means of the gum catheter three or four times daily, to remove the urine completely,

and at least to offer the possibility of re-acquiring power to the muscular coat, which does not exist so long as that coat remains constantly distended by the retained urine.

Next, for pure atony and for slight paralysis, uncomplicated with prostatic enlargement, a little aid may be sometimes afforded to the patient through the agency of electricity, by cold douches and injections, and by tonics; but less advantage is to be derived from these means, in my opinion, than some have appeared to believe, although I by no means say they are not sometimes serviceable. I have seen an increase of expulsive power attained rapidly during the daily application of an electro-magnetic current to the bladder, and in the following manner:—To one pole the ordinary handle and moist sponge are attached, which is placed over the lumbar vertebrae; an elastic bougie, containing a conducting wire, and tipped with metal, is attached to the other pole, and is introduced into the bladder. A weak current is set going, and its effects watched. Thus a slight sensation only is to be produced. This accomplished, you should move the bougie about gently in contact with the walls of the bladder, the urine having been just withdrawn; and, finally, let it rest a little in the neck of the bladder, where greater discomfort is felt: in all, allowing the current to pass for eight or ten minutes before withdrawing.

A very different condition to that just described sometimes results after severe lesion, and also after local injury—viz., inability on the part of the bladder to act in any way as a reservoir. In this unfortunate situation the urine leaves the organ by the urethra as fast as it enters by the ureters. This is complete incontinence, in the true sense of the term. Little else than mechanical contrivances are of any avail. And these consist of making a reservoir outside instead of

inside the body ; one which can be emptied at the patient's will. Happily, such cases are very rare.

But there is a partial incontinence which is very common, and which is, moreover, amenable to treatment. You will be consulted by an anxious mother who, bringing her boy or a girl, of any age below puberty, and occasionally above that period, tells you that every night, or nearly so, this young person wets the bed. Examples of this are frequently seen in my out-patient room. You know that, in a child with a busy, excitable brain, muscular movements occur during sleep of a much more active character than those which usually occur in the adult, or in children of a more placid temperament. Anything up to somnambulism may take place during sleep in a child whose *physique* is weak, and the slave of a restless, ceaseless activity of mind ; and micturition during sleep often occurs in connection with this state. Clearly, however, not only in such cases ; for in some very dull and stupid children, in whom intelligence appears to be below the average, the same thing may happen. And it must also be admitted that there are cases which do not fall into either of these classes. For such unfortunate patients all sorts of remedies and all kinds of management are adopted, including even a periodical employment of the birch—a species of "cystus" which I trust you will never admit into your own therapeutic scheme. Depend upon it that "punishment" for this form of youthful frailty will not answer ; and whatever of strength to the moral faculty may be communicated in obedience to the ancient injunction not to spare the rod—a question beyond our province to discuss—do not regard it as binding on us who practise the healing art. The child's attendants often lose patience at the perpetual recurrence of the disagreeable infirmity, and believe it

to be the result of wilfulness or of carelessness. I have seen much cruelty practised, even by the nearest relatives of these unhappy offenders. Give it no countenance whatever.

Now for treatment, briefly, and as much as I can on general principles. For class the first you will cultivate the physical side of life; remove as much as possible the sources of over-mental stimulation; strengthen the constitution through the agency of diet, country air, or sea-bathing, if possible, and give steel wine and cod-liver oil. For class the second,—those of torpid and deficient intelligence,—you must show the importance of developing mind. Endeavour to call the will into play as much as possible, and enlist it to aid you in preventing the act. These are the children who are usually ill-treated; instead of which they must be made sensible of the degradation of the habit, so as to get a stimulus for volition in relation to it. Here remedies which act specifically on the organs are most appropriate. First and chiefest is belladonna; which apparently paralyzes the expulsive muscles of the bladder and the sensitiveness of the organ at the same time. Thus in elderly people, who have feeble power to expel the urine, a dose often produces complete retention, and that for some time, unaccompanied by consciousness of inconvenience from it. To these young patients you should give small doses, at first, of the tincture, in the afternoon and at bedtime, increasing them gradually to a considerable extent, if necessary, until the influence of the drug is quite manifest. If thus the bladder is made to retain the urine all night for a time, a new habit is formed in place of the old one, and the probability is that it will persist on discontinuing the medicine, which, however, should be done by degrees. This remedy is so excellent a one that it has almost superseded blisters to the sacrum and such counter-

irritants. After it, *hux vomica* may be tried. A combination of strychnia, with belladonna, say 1-48 to 1-86 of a grain, has succeeded with me after failure by the latter alone. Then, for confirmed cases, after the failure of other treatment, especially for those who have arrived at puberty, or thereabouts, a mild caustic solution to the prostatic urethra—say ten grains to the ounce of water—has answered in my hands; to be repeated with a stronger solution if necessary. This for either sex; but I have found for boys the frequent passing of a soft bougie, which is left in the urethra for two or three minutes at a time, suffice to arrest the habit. When the prepuce is very long and cannot be easily retracted, it is most desirable to perform circumcision.

In all cases inquire carefully for derangements of digestion, in all its stages, from primary stomach symptoms to worms in the lower bowel—not unfruitful in their adverse influence. Of course you will take care that the child has not too much fluid, nor takes too much of solid food containing much water in its composition, during the latter third of the day; and that it is taken up to pass water late in the evening, when its attendants go to bed.

A short sketch of Tumours proper to the bladder and prostate will finish this part of our subject. Of course you are to understand that all those outgrowths from the prostate which come under the head of hypertrophy, since they are more or less composed of structure identical with, or very similar to, that composing this organ, however much they may project into the cavity of the bladder, are not to be included in the present class; although it is not an uncommon error to do so.

Tumours proper to the bladder are of rare occurrence. I wish you to know what they are—what it is possible you

may meet with, so that you may have the chance of recognizing an example if it falls in your way. As with those in other parts of the body, they are classified according to the amount of force which they manifest to invade surrounding structures, or to reproduce themselves elsewhere. Thus, first, we have simple fibrous growths, chiefly in the form of polypi, springing from the walls of the bladder, and wholly unassociated with the prostate; the rarest of all forms—in short, exceedingly rare, known to me personally only in museums.

Secondly, there is the "villous or vascular tumour" of the bladder, miscalled "villous cancer;" for it has no invading or reproductive power beyond the organ in which it arises.

Thirdly, there is epithelioma—the lowest type of malignant formation, and slowest of development.

Fourthly, true scirrhus occurs in the walls of the bladder; and, much less commonly, encephaloid.

Respecting the prostate, it may suffice to say here that the only tumour to which it is subject, the tumour-form of hypertrophy put aside (*vide* p. 74), is a malignant tumour, and that of the encephaloid variety. If scirrhus ever invades this organ, it must be excessively rare. I have never seen a case in practice or in any museum.

Now, putting the first form of vesical tumour, or polypus, out of the question, it may be said in general terms of all the rest, that the single and most certain characteristic of the presence of a tumour is *persistent vesical haematuria*, no calculus or other obvious cause existing.

But never arrive hastily at the conclusion in your own mind, nor even too readily admit the suspicion that tumour is present: for you will remember, in the first place, that it

is exceedingly rare, compared with other causes of similar symptoms; and, secondly, that there are no early positive signs, or almost none which can be so regarded, of its existence. It is only by a long process, and after much careful watching of any case, and consequently when the disease is in a somewhat advanced stage of development, that you can, and mainly *per viam exclusionis*, conclude with some reason that a tumour is present. The symptoms are almost identical with those of calculus, and the patient is certain to be sounded more than once or twice before tumour is even suspected. Suppose, then, that you have verified the absence of stricture, of prostatic enlargement, of chronic retention of urine, of calculus, of primary renal disease, and you are at a loss to know why your patient passes water with great frequency and pain, the secretion containing more or less muco-pus, and having blood in it often or continuously, the quantity of which is increased by exercise,—you direct your inquiries to the existence of vesical tumour. And you will proceed thus: First, you will introduce into the bladder the short-beaked sound, and with a finger in the rectum you will carefully explore the thickness of the structures intervening between the finger and the sound. Next, the sound being still in the bladder, you will not find much difficulty, provided the patient is thin, in gaining some information of a like kind by palpation above and behind the pubic symphysis. Further, by movements of the sound itself, you may detect a hard mass of scirrhus on either side of the vesical walls, the sound not turning over readily to the left or right, as the case may be. You will not discover a villous tumour thus, for it is much too soft, and will elude the most delicate traversing of the cavity which can be achieved. Even an epithelial

growth, which is usually wide in its base, of flocculent surface, and sprouting into the cavity, although not very luxuriantly, is so deficient in induration as not to be readily discoverable. It scarcely destroys the flexibility of the vesical coats, which is the fact you have to ascertain.

In nine cases out of ten you will, as the case advances, discover by rectal examination, a mass in the bowel, not globular and homogeneous in density, like most hypertrophies of the prostate, but a dense and irregularly formed tumour, by no means symmetrically placed, and extending far back, often beyond the power of the finger to define. Inequality in surface as you explore it, unevenness in texture, while it is for the most part hard and unyielding to pressure, are the characters which will compel you to form the gravest conclusion as to the nature of the growth. Most rarely is the tumour at the apex of the bladder, and beyond our reach in the bowel. Almost invariably is that portion of the bladder involved, which can be touched by the finger. I have lately verified the fact of exception in one case, and therefore regard it.

Next, you may search for enlarged glands in the iliac regions, but they are palpable only in advanced cases of scirrhus, and you will obtain such light on the subject as a search for cancerous growths in other parts of the body may afford you. Thus, not long ago, I had my diagnosis of cancer of the bladder in the case of an elderly patient made certain by the appearance of a secondary growth, springing from the cranium.

Again, you will repeatedly and carefully examine the deposits in the urine for the appearance of organic materials cast off from the growth, which may serve to indicate its nature. Thus, I have detected under the microscope the

peculiar structure which the processes of the villous tumour present to the eye. But what of the cells of epithelioma, and what of "cancer-cells?" I am compelled to resign to others—and I am well aware that several writers on this subject have proclaimed the value of microscopic examination of the urine in vesical cancer—the good fortune of absolutely identifying malignant disease by this means. First, suppose you have caught your "cancer-cell," are you prepared to swear to its identity? As students, I will assume you have examined, say a few hundred specimens of urine, not many, but enough, at all events, for my purpose, and that you have, therefore, not a little perplexed yourselves, if you are of an inquiring turn, with all that fruitful progeny of cells, epithelium of different parts and in all stages of growth, &c., which are desquamated in health, but especially under the influence of any morbid action in those passages, and which appear therefore in the urine. Some of the best "cancer-cells" I ever saw in my life were collected from a patient's urine, and placed under the microscope by an eminent microscopic observer, for the purposes of a very important consultation, at which I assisted. After a careful examination of the patient, I admitted the beauty and perfection of the microscopic observation, but on larger grounds denied the existence of cancer in the bladder; and the ultimate result, happily for the patient, confirmed that view, and disproved the cell. Most valuable as is the microscope in this great class of maladies, ranking next, and very near to, the sound itself, never let it obscure for you those broad features of the case which are to be determined by the unassisted eye and touch, as applied to the body, and to the urinary secretion itself through the means of reagents. But when you find, as

sometimes happens, distinct masses of soft, almost semi-translucent structure of considerable size, passed by the urethra at micturition, and discover on examination that these evidently consist of rapidly-formed cell-growth, the cells of large dimensions, and containing two or three nuclei, the observation will go far to confirm your suspicions of cancer aroused by pre-existing symptoms.

Lastly, you will, in endeavouring to determine the particular kind of growth, observe the nature of the haemorrhage and the character of the pain. In malignant disease, the haemorrhage is irregular in its occurrence, long intervals being sometimes observed in which no bleeding appears; and when it does take place it is often in considerable quantity, and it may persist for some time; moreover, the blood is usually of a florid colour. In villous growths the urine is generally more persistently coloured, and presents a reddish tint, resembling the juice of raw meat—not dark or smoky in hue; occasionally, however, rapid and considerable haemorrhage takes place. The pain of cancer is more constant and severe than that of villous growth, the latter not being necessarily accompanied with great pain, unless obstruction to the outflow of urine is produced by the tumour.

What shall I say here respecting the treatment of vesical tumour? That it must be shaped according to the existence or predominance of certain symptoms, which may be regarded as three in number: haemorrhage; painful and frequent micturition; retention of urine.

For the treatment of haemorrhage, I shall first name the internal astringents, I mean those administered by the mouth, as gallic and tannic acids and the acetate of lead, for which I have little to say by way of commendation.

The agents which have been most valuable in my experience are alum, iron alum, and an infusion of matico,—of these the alums have been associated with the best results; you may give from ten to fifteen grains of either three times a day, with ten, fifteen, or twenty minims of sulphuric acid, adding syrup to make it palatable; and it certainly is so, and does not generally derange the stomach at all, which cannot be said of gallic acid or of lead. Of the infusion of matico, not less than two ounces should be taken every three or four hours if bleeding is considerable.

For the local treatment of vesical haemorrhage, when it is chronic and constant, I know of nothing so good as injections into the bladder of nitrate of silver, commencing with one grain to four ounces of distilled water, most gently and carefully used, for it is almost unnecessary to state that by such local treatment it is very easy to provoke more bleeding if your handling is rough. You may throw in an injection daily, in the manner before described (page 196), permitting an ounce to remain when the catheter is withdrawn: and the quantity may be augmented gradually as far as to one grain to the ounce, provided that undue pain is not caused. Few can bear this quantity without considerable uneasiness, and this sign of its action should, I think, be reached if the bleeding remains still unchecked. When haemorrhage is considerable, absolute rest in bed, cold applications and avoidance of instrumental interference, unless absolute retention renders it necessary, are the main additional elements of treatment. If instruments are really necessary to withdraw blood and urine, then the slow injection of iced water, or better still, of iced infusion of matico, may be useful. Even a mild solution of the tincture of the perchloride of iron as a cold injection I have known in one

case to succeed when all others have failed. The proportion was one drachm of the tincture to four ounces of water.

For alleviation of pain or frequency of micturition do not spare opiates—trying any form, or all forms in turn, until you find that which most assuages it and least disturbs the digestive organs. Give them by mouth, subcutaneously, or by suppository. Never mind how much, in order to act effectually. It is not a question of saving life, but a question of mitigating that most frightful of human miseries—prolonged, continuous, severe bodily suffering; and this for a patient whose doom is certain, and to whom life has come to be for the most part a dire calamity. While you are bound, therefore, on the one hand jealously to guard life, I hold that you are equally responsible, on the other, that it shall be rendered fairly durable. I confess that I have felt sometimes almost indignant at the sight of a poor fellow-creature, worn out with anguish, praying for death, who, thanks to a well-meaning but weak timidity, is permitted only such small comfort as fifteen or twenty minims of liquor opii, or of a solution of morphia, once or twice in the twenty-four hours can afford.

For the relief of chronic retention of urine, such catheterism must be applied as the case requires, whether periodically or continuously, as the comfort and the exigencies of the patient render desirable.

I shall close this course with a lecture on "Haematuria," which will permit me to glance at most of those subjects which have not yet come under our consideration.

LECTURE XIV.

HÆMATURIA AND RENAL CALCULUS.

GENTLEMEN,—I propose to-day to complete the programme I originally designed for this course by considering a phenomenon of common occurrence known as Hæmaturia.

Let us define the term. What is Hæmaturia? The outflow of urine containing blood in admixture. Thus bleeding from the penis at other times than at that of micturition is, of course, not hæmaturia. Bleeding coincident with micturition from chordee, or operation, or from any known injury in the course of the urethra, is also not to be included in the meaning of the term. The blood then usually issues by the side of the stream of urine, and is only partially mixed at its line of contact, or it may follow rather than accompany the urine.

Hæmaturia, then, is a symptom. Its presence is, in all cases of urinary disease, to be sought. Hence the inquiry forms one question—the third—of the necessary four which I instructed you always to ask in forming a diagnosis. Here is a glass of urine, evidently containing an admixture of blood. What is the source of it? Now, it is often not an easy thing to state at once what point of that long and complicated organic apparatus, which commences in the Malpighian corpuscles and ends at the external meatus, is

the source of the blood in question. Sometimes it is exceedingly difficult to define its source. Thus it is that in medicine you will often find some symptom, the pathological cause of which is not very obvious, getting a specific name, and coming at length to be erroneously regarded as a distinct disease ; and just as you will be asked, as I told you the other day, what is good for dropsy, you may also be asked what is good for haematuria.

Now, the consideration of this question, besides affording us new material for inquiry, will bring us over some of the ground we have already travelled together. I don't regret that—for your sakes, I mean. It will stand in the same relation to the past as the arithmetical "proof" does to the already worked sum. It is in some respect a synthetical operation following an analytical one. When, therefore, you see a specimen of urine containing blood, you will, as a matter of course, make a rough mental note of the proportion of blood present, and you will mark the colour. And as you can count on your fingers the ordinary sources of blood, these will pass rapidly in review at the same time. Let us name them as follows :—

1. The kidneys, where it may be from diseased action more or less temporary, as inflammation ; or from disease more or less persisting, as degeneration of structure ; or from mechanical injury, as from calculus there, or by a strain, or a blow on the back. If the haematuria is the result of inflammation, there will be general fever denoting its presence ; if produced by slow organic change, there will be the history of failing health, and probably urine changed in quality otherwise than by the mere admixture of blood. When blood is in very small quantity, as it will naturally be at times, note the character of the urine proper—whether of

low specific gravity, pale, with albumen in greater proportion than blood or pus will account for ; perhaps renal casts may be found ; and look out for dropsies in any degree. In both the preceding forms, if blood is present, it will give the smoke tint to the secretion. Perhaps it may be affirmed that such urine, associated with very little if any local pain, is more likely to come from the kidney than elsewhere. In malignant renal tumour, blood may be large in quantity at times ; the rapidity of growth and the size attained, are the marked characteristics of the disease. If mechanical injury be the origin of hæmaturia, there will be the history of a blow or strain ; or there may be the signs and symptoms of renal calculus, of which more detail presently.

2. Then, putting aside the ureters, you will remember the bladder as the second source of hæmorrhage ; and here it may be due to severe cystitis, calculus, or tumour. The first is obvious enough from muco-pus in the urine, and through other signs ; while the second may well be suspected by the symptoms, and its presence realized by the sound. Here the hæmorrhage is usually florid, and in proportion to the patient's movements. But the third condition—namely, that the hæmorrhage arises from tumour—is not always so readily to be affirmed. As a rule, however, blood from such a source is larger in quantity than from stone, and may be associated with less of muco-pus. If the tumour is malignant, it may be felt by examination, and the pain is often severe ; if villous, it gives an even pale-red tint for days together to the urine ; and in both cases the blood is florid, unless it is long retained in the bladder, when dark sanies, like coffee-grounds, results.

3. In hæmorrhage from the prostate, the third principal locality or source, the same thing occurs, if the organ is

hypertrophied and the blood is retained; but here the age of the patient, the history of gradually increasing trouble, and the ascertained condition of the organ from the bowel, aid the diagnosis. A slight appearance of blood mixed with the last few drops of urine is not a rare occurrence in chronic prostatitis.

4. When bleeding arises from stricture of the urethra, the patient's history and the cause of the bleeding, almost always instrumental, leave no room for doubt. From the use of instruments also in the bladder, haemorrhage sometimes arises. Then it is not to be forgotten that occasionally blood is found in the urine as the result of violent diuretics, from purpura, in fevers, and in a haemorrhagic diathesis.

Now for the treatment of haemorrhage. When you have determined that its source is above the bladder—that is, in the kidney or in its pelvis, probably the first and most influential remedial agent is rest in the recumbent position. Whether from a lesion affecting the intimate structure, or from the mechanical irritation of a calculus in any part of the organ, rest is the first and the essential condition. The patient is, moreover, to be maintained in as cool and tranquil a state as possible.

It is in renal more than in any other form of haematuria, perhaps, that direct or internal astringents or styptics are useful. I shall do no more than name those which are most commonly used—namely, alum, gallic and tannic acids; lead and turpentine; equal to them is, I think, the infusion of matico, say in doses of two ounces every two or three hours. The tincture of iron, and also sulphuric acid, may sometimes be taken with advantage. But see page 217, in the preceding lecture.

It is, however, in cases of severe hæmorrhage from the bladder, or more commonly from an enlarged prostate, that active and judicious treatment is necessary. You will be called sometimes to a patient whose bladder is distended with coagulated blood, or who is passing frequently a quantity of fluid in which blood is the predominating element. Usually this has arisen from some injury inflicted by the instrument, although it may also be from tumour of the vesical walls. Here you will keep the patient on his back, and forbid the upright position, or any straining, so far as you can prevent it, in passing water. To this end give opium liberally, to subdue the painful and continued action of the bladder. Apply cold by means of bags of ice to the perineum and above the pubes. Better still, introduce small pieces of ice into the rectum. Do not use an instrument if it is possible to do without it. There is a great dread in some people's minds about the existence of a large coagulum in the bladder. I have even known a bladder to be opened above the pubes by the surgeon, for the mere purpose of evacuating a mass of clotted blood. Leave it alone: it will gradually be dissolved and got rid of by the continued action of the urine; while if you are in haste to interfere, and are very successful in removing it, you will succeed also most probably in setting up fresh hæmorrhage. The bleeding vessels have a far better chance of closing effectually if they are not subjected to mechanical interference. Meanwhile, support the patient's powers by good broths, &c.

But it sometimes happens that hæmorrhage occurs in a patient who has long lost all power of passing urine except by catheter. This is a very different position. Here the coagulated mass which fills the bladder must sometimes be removed, or no urine can be brought away. Thus you

introduce a catheter, and none appears, for the end of the instrument passes into a mass of coagulum, and nothing can issue. Sometimes sufficient may be removed by attaching to a large silver catheter a six-ounce syringe or a stomach-pump. Clover's lithotritry apparatus has answered remarkably well with me in two or three instances. Let me caution you, as a rule, not to inject styptics into the bladder in these circumstances; the irritation does more harm than good. There are some few exceptions, but it rarely happens that the injection of any powerful styptic does not produce painful spasm of the bladder, a condition in which haemorrhage is more commonly increased than diminished. (See page 217.)

In passing to another subject, I beg to call your attention to a glass before you containing some urine of a dark and somewhat unnatural tint. Let us interrogate the case of the patient from whom it came. In obtaining this specimen I took care that he should first pass about an ounce into a separate vessel, to clear his urethra—a precaution always absolutely necessary to avoid error, as I have before warned you—and the remainder into this. It is less translucent than average healthy urine is, and has a deeper colour. The hue is not red, but slightly orange, with a dirty grey-brownish tint, commonly and very well distinguished by the word "smoky." That tint denotes blood to an ordinarily practised eye. Why is it not red? Because blood, after a certain term of contact with urine, loses its red colour and becomes brown; and you see it in that condition, or according to the quantity, producing any depth of hue from this up to that of London porter. Put it under the microscope, and you will find plenty of blood-corpuscles. We get this broad principle, then, to start with: bleeding from the

more distant parts of the urinary system, unless in very large quantity, will almost certainly make the urine brown, while urine which contains red blood has almost certainly issued recently from some source in the bladder, probably at or near its neck, these being the more common sites of vesical hæmaturia.

In the case before us, then, we proceed easily and rapidly to eliminate many of the sources of bleeding by physical exploration, and by the account which the patient gives of his sensations. His age is forty-five years. He makes a good stream when a fair amount of urine has accumulated in his bladder, but this does not often happen, for he passes it every two hours, or less, in the day, not so frequently at night; no straining is necessary. Pain in the course of the urethra is experienced during and after micturition; not severe. He is uneasy about the pelvis and loins on taking exercise, and more blood passes afterwards. He is somewhat emaciated, and so presents a good condition for examination by the hand. He is subject to variation in the intensity of the symptoms, having now and then attacks of a few days' duration, in which they are aggravated and especially the left renal pain; and he dates their commencement from an attack which occurred seven years ago, which was accompanied by vomiting; this or nausea have recurred sometimes on these occasions since. He has never passed gravel. He is less robust than formerly; his digestion is not good. A full-sized bougie passes easily into the bladder; no stricture; hypertrophy of prostate at his age not possible. On sounding, he is manifestly more tender than usual; nothing is felt, nor any deviation from the natural condition by simultaneous examination by the rectum. Palpation of lower part of abdomen shows nothing. Arriving close under

the last ribs of left side with one hand, the other pressing firmly on left renal region, he flinches unmistakably; that is the spot, he says, where he feels pains at times and on movement; right side, nothing. We examine his urine: sp. gr. 1018, acid, small brownish deposit on standing; under microscope, blood-corpuscles, some pus-corpuscles, epithelium, no crystals, no casts; albumen, a little, but only corresponding with organic matters present.

What is the seat of the lesion in his case? You say, perhaps, the bladder: we found it tender to the sound, and it acts with undue frequency. Yet remember this is by no means sufficient evidence of any primary morbid change there, this symptom constantly accompanying diseases affecting primarily the kidneys or the upper part of the ureter while the bladder is healthy. Much more probably the kidney. The history, the manifest local tenderness, the repeated attacks, the impaired health, the absence of all the more common causes of cystitis in any form, point to the left kidney as the seat of mischief. The absence of albumen and renal casts—a fact of not much weight, although their presence is of the utmost importance—lead us to believe him free from organic changes affecting the renal structure. I conclude that his left kidney is the seat of calculus, although he has never passed one, and has at present no crystalline deposit in his urine—a fact by no means essential to the diagnosis; and that this calculus is the source of the blood and pus found in his urine.

It is sometimes not easy to say what kind of calculus exists in these cases, of which this is a fair type. When any calculous matters have been passed which can be examined, or when the crystalline deposit in the urine is constant, the inference is pretty clear. Add to this that the

: probability in any case is strong in favour of uric acid, from its known frequency of occurrence—taking large numbers, say at least fifteen to one as compared with oxalate of lime.

For treatment: Alkaline diuretics and diuretic vegetable infusions, before named, for a period of time; attention to the digestive functions and to that of the skin, for the kidneys are probably working too much vicariously for some other function acting lazily; some mild form of counter irritation over the renal region, moderation in highly nitrogenized food, a considerable proportion may be advantageously vegetable; mild alcoholic drinks,—in many cases none should be permitted, in others only a light and mild Bordeaux. Of all medicinal remedies, perhaps none are so valuable as mineral waters, especially those which have sulphate of soda, largely diluted, as the main ingredient. For two well-known remedial agents, which are very popular, each among its class, I am bound to tell you, I have very small esteem. Here, in town, it seems to me that every man advises his neighbour, and on every pretext, to drink Vichy water—advice which is cheap, and of which the value in most instances by no means exceeds the cost. In the country, where perhaps the fairer sex more usually dispense similar aid to their suffering neighbours, the prescription is mostly gin-and-water. Of the first, or natural product, which is a strong solution of carbonate of soda, I must say that, if not absolutely injurious, it is at least greatly inferior to potash; and of the second, or artificial one, that it is about as serviceable to the kidneys as a pair of spurs to a jaded horse—makes him travel for a time, but takes it out of him in the long run. This subject has, however, been treated in detail in the XI. Lecture. For the

paroxysms of severe pain which denote the passage of a renal calculus, you will find hot hip-baths, prolonged or often repeated, of the greatest service; the temperature may be increased to anything the patient can bear. The application of a hot linseed poultice, the surface of which has been sprinkled with flour of mustard, an excellent rubefacient at all times for this region, may intervene, or be substituted for the bath. The patient should be allowed large doses of opiate, also, to assuage severe pain; and abundance of barley-water, potash-water, or the like, for drink.

I shall here, by way of episode, refer to a mode of determining the true characters of a patient's urine, which is of extreme value in some doubtful cases—a mode which has never to my knowledge been recommended or practised, and which I have systematized for myself. I have already told you how essential it is to avoid admixture of urethral products with urine, if you desire to have a pure specimen, and how you may attain this object by the use of two glasses. It is sometimes quite as essential to avoid its admixture with products of the bladder. And I defy you to achieve an absolute diagnosis—by which I mean a demonstration, and never be satisfied with less, if it be practicable—in some few exceptional cases, without following the method in question. When, therefore, it is essential to my purpose to obtain an absolutely pure specimen of the renal secretion, I pass a soft gum catheter, of medium size, into the bladder, the patient standing, draw off all the urine, carefully wash out the viscous by repeated small injections of warm water (before shown to be rather soothing than irritating in their influence), and then permit the urine to pass, as it will do, *guttatim*, into a test-tube, or other small glass vessel, for purposes of examination. The bladder ceases for a time

to be a reservoir; it does not expand, but is contracted round the catheter, and the urine percolates from the ureters direct. You have, virtually indeed, just lengthened the ureters as far as to your glass. And now you have a specimen which, for appreciating albumen, for determining reaction, and for freedom from vesical pus, and even blood, and from cell-growths of vesical origin, is of the greatest value, and has often furnished me with the only data previously wanting to accomplish an exact diagnosis.* Mind never to be satisfied to guess at anything; make, very cautiously, if you will, your provisional theories about a doubtful case—indeed, the intellectual faculty must constantly do this, and without reference to the will—but arrive at no conclusion, take no action, except so far as you are warranted by facts.

I have reserved these few words to the last, as the most important. The first words I uttered in this course were designed to convey to you my strong sense of the importance of acquiring the habit of making an accurate diagnosis, and a rapid one, if possible. My last shall be to express once more the same conviction. Not because I undervalue the subject of treatment, but precisely with the opposite view; being anxious, above all things, that you and I should afford some essential service to those who have confided to

* Now and then, although very rarely, in some states of the bladder, the presence of the gum catheter itself will occasion a little blood to exude from the mucous membrane lining the cavity. This being obvious to the eye will show a source of fallacy, and it is never to be forgotten that a very small proportion of blood-admixture with urine will give rise to a large albumen deposit, on the application of the usual tests. The value of the experiment, however, is not in the way of making manifest the presence of albumen in any doubtful case, but in showing that when it is largely present, the urine drawn direct from the kidney, may, nevertheless, be without a trace of it, a most important fact to determine.

us the care of their maladies. I adjure you to spare no pains to obtain the most complete knowledge of the complaint itself, since it is the only mode of arriving at a knowledge of what will be sound and efficient treatment.

I beg to thank you for the extreme attention and assiduity with which you have followed me during this course, and to assure you that such a manifestation on your part has rendered our meetings for these colloquial discourses some of the most agreeable relaxations which have fallen to my lot, to vary the routine of an anxious and very active professional life.

THE END.

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